CHAPTER FIVE: ENVIRONMENTAL CONSEQUENCES

Introduction

The purpose of this chapter is to discuss impacts on the environment that may be brought about by actions in the various alternatives.

The National Environmental Policy Act (NEPA) requires that environmental documents discuss the environmental impacts of a proposed federal action, feasible alternatives to that action, and any adverse environmental effects that cannot be avoided if the proposed action is implemented. This section of the *General Management Plan* describes the potential environmental impacts of implementing each of the four alternatives on natural and cultural resources, the visitor experience, the socioeconomic environment, and National Area operations and facilities. These impacts provide a basis for comparing the advantages and disadvantages of the four alternatives.

In this chapter, impact topics are analyzed under the following headings:

- Natural resources
- Cultural resources
- Visitor use and experience
- Socioeconomic environment
- Operational efficiency

The first part of this chapter discusses the methodology the planning team used to identify impacts and includes definitions of terms. The alternatives are then analyzed with reference to the No-action Alternative (continue current management).

Analysis of the No-action Alternative identifies what resource conditions would be if no changes to facilities or park management occurred. This alternative reflects changes associated with the growth in regional population and increased visitor use that is anticipated during the next 15 – 20 years. The three action alternatives are then compared to the No-action Alternative to identify the incremental changes that would occur as a result of changes in park facilities and management. All impact topics are assessed for each alternative. The discussion of each alternative includes a description of the positive and negative effects of the alternative, a discussion of cumulative effects, if any, and a conclusion. The conclusion includes a discussion of whether, and to what extent, the alternative would impair park resources and values. For the analyses, the planning team considered the mitigation measures described in the action alternatives.

At the end of each alternative there is a discussion of energy requirements and conservation potential; unavoidable adverse impacts; irreversible and irretrievable commitments of resources; the relationship of short-term uses of the environment; and the maintenance and enhancement of long-term productivity. The impacts of each alternative are briefly summarized in a table at the end of Chapter 3.

The alternatives in this plan provide management directions on an area and facility basis. Because site-specific analyses were not undertaken and only typical situations considered, this environmental impact statement should be considered a programmatic analysis. Consistent with the National Environmental Policy Act and agency procedures, NPS will conduct additional environmental documentation before implementing site-specific actions. Where required by NPS policy, this documentation will include a Statement of Findings. In instances where specific actions already are accurately described by the programmatic treatment in this plan, that fact will be documented by NPS, with no separate environmental assessment or environmental impact statement prepared. This process would be applied only to trail, trailhead, and road projects as described in the introductory text to the “Individual Proposals” discussion in chapter 3. This process would not be applied—meaning a separate NEPA document would be prepared—for projects involving first and second

order development and visitor use sites. Separate NEPA analysis would also be conducted for any new all-terrain vehicle ("ATV") route in the ATV Planning Area.

Documentation of project coverage by this document would consist of the following steps. Pre-project surveys must determine that all aspects of the project are reflected, discussed, and analyzed in this document and that the conclusions included herein are fully applicable. Use of NPS' Environmental Screening Form (ref *Director's Order 12*) will specifically document that this analysis has been conducted. The form will be used to document the specific sections and page numbers of the GMP that apply.

Pre-project survey results that do not fully reflect the GMP discussion will also be documented. The dissimilar results will be the basis of the need to prepare a separate NEPA document. Specific exceptions, or "kick outs," would include, but not necessarily be limited to, the following:

- ✓ The presence or potential adverse effect on federal or state threatened or endangered species
- ✓ The presence or potential effect on cultural resources eligible or potentially eligible for listing in the National Register of Historic Places
- ✓ The project is highly controversial (Effort would be made to identify and involve, as appropriate, interested parties and gauge the degree of controversy over the project following consideration of reasonable alternatives and available mitigation. Information on projects determined eligible for coverage under this programmatic treatment would be made available to the public in a regular manner.)

METHODOLOGY

The planning team based the impact analysis and the conclusions in this part largely on a review of existing literature and park studies, information provided by experts within the National Park Service and other agencies, park staff insights and professional judgement.

The following section describes the methodology used for assessing impacts to natural resources, cultural resources, visitor use and experience, the socioeconomic environment, and National Area operations.

Natural Resources

Impact Assessment

The National Park Service is required to protect the natural abundance and diversity of all of the National Area's naturally occurring resources and communities. NEPA calls for an examination of the likely impacts of the alternatives on all components of affected ecosystems.

Proposed actions and management zoning under this plan were evaluated in terms of the context, intensity, and duration of the impacts, as defined below, and whether the impacts were considered beneficial or adverse to the natural environment. Generally, the methodology for natural resource impact assessments follows direction provided in the Council on Environmental Quality (CEQ) Regulations for Implementing The National Environmental Policy Act, Parts 1502 and 1508.

Geology, Physiography, and Soils. This analysis identified potential impacts to geologic, physiographic, and soil resources associated with the proposed actions and management zones in the various alternatives. The analysis concentrated primarily on the impacts associated with rehabilitation of National Area infrastructure, principally roads and trails. However, consideration was also given to the effects of continued oil and gas extraction, as well as the impacts of visitor use on topsoil, the gorge rim, and geologic features (such

as arches and rock shelters). The ability to do a quantitative analysis is limited due to the prescriptive nature of the alternatives. Qualitative analysis relies substantially on professional judgment to reach reasonable conclusions as to context, intensity, and duration of potential impacts, and whether the impacts are considered to be beneficial or adverse to geological and soil resources. When possible, mitigation measures were incorporated into the plan to reduce adverse impacts.

Water Quality. The water quality analysis identified potential effects on surface water hydrology and water quality associated with the installation and rehabilitation of National Area infrastructure, principally roads and trails. The analysis also examined impacts from visitor use and the generation of non-point pollution, such as acid mine drainage and runoff from oil and gas extraction sites. The relationship of pollution sources to existing water quality in the National Area has not been sufficiently studied and modeled to quantitatively assess impacts. The limited amount of baseline information on the physical, chemical, and biological characteristics of park surface waters and groundwater makes it difficult to detect changes in water quality. Consequently, water quality impacts of the alternatives were assessed qualitatively.

Floodplains. The impact assessment for floodplains focuses on natural river processes and aquatic habitat. Flooding in the National Area occurs regularly, often several times a year (to various levels), and is exclusively precipitation-induced. Impacts were assessed using data derived from geographic information system (GIS) mapping and available floodplain maps of major development areas. The *Floodplain Management Guidelines* (NPS 1993) and the extent of alteration to natural river processes were used to define the intensity of impacts.

Wetlands. Wetland impacts were assessed by evaluating the alternatives in relation to wetland inventory maps and vegetation mapping. The magnitude of the resulting impacts on wetlands was determined based on the potential for wetland acreage loss and the size, integrity, and continuity with other wetlands.

Air Quality*.* The air quality impact assessment involved the identification and qualitative description of the types of actions under the plan that could affect air quality, corresponding emission sources and pollutants, and relative source strengths. Based on relative source strengths, a qualitative assessment was performed to assess the potential for higher pollutant emissions or concentrations, taking into account the frequency, magnitude, duration, location, and reversibility of the potential impact.

Vegetation. This analysis identified potential impacts to plant populations and vegetation communities resulting from the proposed actions and management zones in the various alternatives. The analysis concentrated on the impacts associated with the building and rehabilitation of National Area infrastructure, principally roads and trails. However, consideration was also given to the effects of continued oil and gas extraction, as well as impacts associated with visitor use of the National Area. The ability to do a quantitative analysis is limited due to the prescriptive nature of the alternatives. Qualitative analysis relies substantially on professional judgment to reach reasonable conclusions as to context, intensity, and duration of potential impacts, and whether the impacts are considered to be beneficial or adverse to vegetation resources. When possible, mitigation measures were incorporated into the plan to reduce adverse impacts.

Terrestrial and Aquatic Animal Life. Impacts on terrestrial and aquatic animal life are closely related to the impacts on habitat. The evaluation considered whether the actions would be likely to displace some or all individuals of a species in the park or would result in loss or creation of habitat conditions needed for the viability of local or regional populations. Impacts associated with wildlife might include any change in roosting or foraging areas, food supply, protective cover, or distribution or abundance of species. Analysis was based on the assumptions listed below.

- The greater the size of a biotic community and the stronger its links to neighboring communities, the more valuable it is to the integrity and maintenance of biotic processes. Development limits the size of a community and fragments and disassociates communities from each other.
- The more developed areas become, the less valuable they are as wildlife habitat. New development would increase human presence and increase the potential for soil, vegetation, and wildlife disturbance. The potential for negative wildlife interactions (such as human injury from wildlife and the introduction of

unnatural food sources) also would increase. The removal of development from an area would increase the value of habitat.
- Development and activities near sensitive habitat may adversely affect adjacent natural communities.
- Disturbance in or near hydrological features may reduce the productive capability associated with natural communities. Modifications that result in soil compactions, loss of riparian vegetation, and accelerated erosion and sediment transport influence important habitat characteristics such as substrate type, location, and cover. These physical aspects often determine the composition of vegetative and wildlife communities.
- Trails generally form barriers for many types of wildlife and fragment habitat.

Endangered Species and other Listed Species of Concern (Special Status Species). Through coordination with the U.S. Fish and Wildlife Service, the Tennessee Wildlife Resources Agency, and the Kentucky Department of Fish and Wildlife Resources, species of special concern were identified that are generally located in or near the park. In addition, National Area staff collected more specific information, such as the absence or presence of each species within National Area boundaries. Professional judgment was used to reach reasonable conclusions as to context, intensity, and duration of potential impacts to special status species, and whether the impacts would be likely to have an adverse effect on federally listed species within the meaning of section 7 of the Endangered Species Act. When possible, mitigation measures were incorporated into the plan to reduce potential adverse effect.

Context

This is the setting within which an impact is analyzed, such as an affected locality or region, affected commercial or cultural interests, or society as a whole. In this EIS, the intensity of impacts to natural resources is evaluated within a local context (i.e., project area) or regional context, as appropriate. The contribution of particular actions or management prescriptions to cumulative impacts is evaluated in a regional context.

Intensity

This evaluation used the approach for defining the intensity (or magnitude) of an impact presented in *Director's Order 12: Conservation Planning, Environmental Impact Analysis and Decision-making* (NPS 2001). Each impact was identified as negligible, minor, moderate, or major. Because this is a programmatic document, intensities are expressed qualitatively.

The definition of intensity varies by impact topic, as follows:

Geology, Physiography, and Soils:

- *Negligible* – The impact on soils and geological resources would not be measurable. Ecological processes would not be affected.
- *Minor* – An action would change a soil's profile in a relatively small area, but it would not necessarily decrease or increase the area's overall biological productivity and would not increase the potential for erosion of additional soil. For geological resources, impacts would be slightly detectable, but would not be expected to have an overall effect.
- *Moderate* – An action would result in a change in quantity or alteration of the topsoil, overall biological productivity in a small area, or the potential for erosion to remove small quantities of additional soil. For geological resources, impacts would be clearly detectable and could have an appreciable effect on resources.
- *Major* – An action would result in a change in the potential for erosion to remove large quantities of additional soil or cause alterations to topsoil and overall biological productivity in a relatively large area. For geological resources, impacts would be substantial, highly noticeable influences on the resources.

Water Quality:

- *Negligible* – An action would have no measurable or detectable effect on water quality or the timing and intensity of flows.
- *Minor* – An action would have measurable effects on water quality or the timing or intensity of flows. Water quality effects could include increased or decreased loads of sediment, debris, chemical or toxic substances, or pathogenic organisms.
- *Moderate* – An action would have clearly detectable effects on water quality or the timing or intensity of flows and potentially would affect organisms or natural ecological processes. Alternatively, an impact would be visible to visitors.
- *Major* -- An action would have substantial effects on water quality or the timing or intensity of flows and potentially would affect organisms or natural ecological processes. Alternatively, an impact would be easily visible to visitors.

Floodplains:

- *Negligible* – Impacts would not occur within the regulatory floodplain as defined by the *Floodplain Management guidelines* (100-year or 500-year floodplain, depending on the type of action), or no measurable or perceptible change in the natural river processes or aquatic habitat would occur.
- *Minor* – Actions within the regulatory floodplain would potentially interfere with or improve river processes or aquatic habitat in a limited way or in a localized area. For example, stream bank manipulation that would protect development areas from flooding could result in minor adverse impacts to natural resources. Removing flood protection devices or small facilities could result in beneficial impacts to natural resources.
- *Moderate* – Actions within the regulatory floodplain would interfere with or enhance river processes or aquatic habitat in a substantial way or in a large area. Examples of moderate adverse impacts would include substantial modification of stream banks to protect roads in multiple locations or to protect large compounds such as Blue Heron.
- *Major* – An action would permanently alter or improve natural river processes or aquatic habitat. An example might include permanent hardening and/or relocation of a stream channel.

Wetlands:

- *Negligible* – No measurable or perceptible changes in wetland size, integrity, or continuity would occur.
- *Minor* – The impact would be measurable or perceptible, but slight. A small change in size, integrity or continuity could occur due to short-term indirect effects such as storm water related runoff. However, the overall viability of the resource would not be affected.
- *Moderate* – The impact would be sufficient to cause a measurable change in the size, integrity or continuity of the wetland or would result in a small, but permanent, loss or gain in wetland acreage.
- *Major* – The action would result in a measurable change in all three parameters (size, integrity, and continuity) or a permanent loss of large wetland areas. The impact would be substantial and highly noticeable.

Air Quality:

- *Negligible* – An action would have no measurable or detectable effect.
- *Minor* – An action would have a slight effect, causing a change in air emissions or visibility.
- *Moderate* – An impact would be clearly detectable and would cause an appreciable change in air emissions or visibility.
    - *Major* – An action would cause a substantial, highly noticeable change in air emissions or visibility.

Vegetation:

- Negligible -- The impact on vegetation (individuals or communities) would not be measurable. Ecological processes would not be affected.

- Minor – The action would affect the abundance or distribution of individual in a localized area but would not affect the viability of local or regional populations.
- Moderate – The action would affect a local population sufficiently to cause a change in abundance or distribution, but it would not affect the viability of the regional population. Changes to localized ecological processes would be of limited extent.
- Major – the action would affect a regional or local population of a species sufficiently to cause a change in abundance or in distribution to the extent that the population would not be likely to return to its former level (adverse), or would return to a sustainable level (beneficial). Important ecological processes would be altered, and landscape-level changes would be expected.

Terrestrial and Aquatic Animal Life:

- *Negligible* – The impact would not be measurable on individuals, and the local populations would not be affected.
- *Minor* – An action would affect the abundance or distribution of individuals in a localized area but would not affect the viability of local or regional populations.
- *Moderate* – An action would affect a local population sufficiently to cause a minor change in abundance or distribution but would not affect the viability of the regional population.
- *Major* – An action would affect a regional or local population of a species sufficiently to cause a change in abundance or in distribution to the extent that the population would not be likely to return to its former level (adverse), or would return to a sustainable level (beneficial).

Special Status Species

For special status species, including federally listed species, the following impact intensities were used. These terms are used to comply with section 7 of the Endangered Species Act.

- *No effect* -- The alternative would have no effect on the special status species, including listed species.
- *Not likely to adversely affect* – The alternative would be expected to have an insignificant, discountable, or beneficial effect on the special status species, including listed species.
- *Likely to adversely affect* – The alternative would be expected to directly or indirectly have an adverse effect on the special status species, including listed species. Actions that could be likely to adversely affect species would include direct or indirect mortality of individuals; the removal or damage of nesting, breeding, foraging, or roosting habitats; impacts on food sources; and disturbance of nests during the breeding season. For wildlife, removal of vegetation could adversely affect species if it increased their susceptibility to predation.

Duration

The planning horizon for this *General Management Plan* is approximately 15 – 20 years. Within this timeframe, impacts that would occur within five years or less were classified as short-term effects. Long-term effects would last for more than five years.

Impact Type

The alternatives were evaluated in terms of whether impacts would be beneficial or adverse to natural resources. In some cases, an alternative could result in both adverse and beneficial effects to natural resources. Beneficial impacts would help preserve, enhance, and restore the natural functioning of ecological systems in the National Area. Adverse impacts would deplete or degrade natural resources.

CEQ regulations and the National Park Service's *Conservation Planning, Environmental Impact Analysis and Decision-making* (Director's Order #12) call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing

the intensity of an impact from major to moderate or minor. All of the alternatives in this plan assume that National Area managers would apply mitigation measures to minimize or avoid impacts. Increased visitor use would generate the need for additional monitoring and the mitigation of impacts. If appropriate mitigation measures were not applied, the potential for resource impacts would increase and the magnitude of those impacts would rise.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Cultural Resources

Impacts to archeological and cultural resources were identified and evaluated by (1) determining the area of potential impacts; (2) identifying cultural resources present in the area of potential impacts that were either listed in or eligible to be listed in the National Register of Historic Places; (3) identifying the type and extent of impacts; (4) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (5) considering ways to avoid, minimize or mitigate adverse impacts.

Impact Assessment

Impacts to cultural resources are described in terms of the context, intensity, duration, and type of impacts. This approach is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA). These impact analyses are intended, however, to comply with the requirements of both NEPA and Section 106 of the National Historic Preservation Act (NHPA). Under regulations issued by the Advisory Council on Historic Preservation, a determination of either *adverse effect* or *no adverse effect* must also be made for affected, National Register eligible cultural resources. Accordingly, a Section 106 summary is included in the discussion of each alternative. The summary is intended to meet the requirements of section 106 and is an assessment of the effect of the undertaking (implementation of the alternative) on cultural resources, based upon the criterion of *effect* and criteria of *adverse effect* found in the Advisory Council's regulations.

An *adverse effect* occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register, e.g. diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association. Adverse effects also include reasonably foreseeable effects caused by an alternative that would occur later in time, be farther removed in distance or be cumulative (36 CFR Part 800.5, *Assessment of Adverse Effects*). A determination of *no adverse effect* means there is an effect, but the effect would not diminish in any way the characteristics of the cultural resource that qualify it for inclusion in the National Register.

Context

The intensity of impacts to cultural resources is evaluated within a local context (i.e., project area) or regional context, as appropriate. The contribution of particular actions or management prescriptions to cumulative impacts is evaluated in a regional context.

Intensity

- *Negligible* – Impact is barely perceptible and not measurable; confined to small areas or a single contributing element of a larger national register district or archeological site(s) with low data potential.

- *Minor* – Impact is perceptible and measurable; remains localized and confined to a single contributing element of a larger national register district or archeological site(s) with low to moderate data potential.
- *Moderate* – Impact is sufficient to cause a change in a character-defining feature; generally involves a single or small group of contributing elements or archeological site(s) with moderate to high data potential.
- *Major* – Impact results in substantial and highly noticeable change in character-defining features; involves a large group of contributing elements and/or individually important property or archeological site(s) with high to exceptional data potential.

Archeological and historical resources are typically considered eligible for inclusion in the National Register of Historic Places because of the information they have or may be likely to yield. Intensity of impacts to archeological and historical resources relates, additionally, to the importance of the information they contain and the extent of disturbance/degradation.

Ethnographic resources are considered eligible for inclusion in the national register when they are rooted in a community's history and are important in maintaining the continuing cultural identity of the community and meet criteria for evaluation and integrity. Intensity of impacts to ethnographic resources may relate to access and use of, as well as changes to, traditionally important places.

Duration

Impacts that would occur within five years or less were classified as short-term effects. Long-term effects would last for more than five years.

Impact Type

The four alternatives were evaluated in terms of whether impacts would be beneficial or adverse to cultural resources. Beneficial impacts would help preserve and enhance those character-defining qualities that make a property significant under national register criteria. Adverse impacts would deplete or negatively alter these resources.

Mitigation would tend to reduce the negative impacts of a particular alternative. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by Section 106 is similarly reduced. Although adverse effects under Section 106 may be mitigated, the effect remains adverse.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Visitor Use and Experience

The visitor use and experience analysis evaluates the impact of the four alternatives on opportunities for visitors to experience the National Area and learn about and appreciate its many resources.

Impact Assessment

This analysis is conducted in terms of how the visitor experience might vary by applying the different management zones and management prescriptions in the alternatives. Analysis is qualitative rather than quantitative due to the conceptual nature of the alternatives. Consequently, professional judgment was used to reach reasonable conclusions as to the intensity and duration of potential impacts, as well as whether the

impacts would be beneficial or adverse. The impact assessment focuses on four aspects of visitor experience, as follows:

Diversity of Visitor Activities.

The analysis of effects on visitor activities is based on whether there was a complete loss, addition, expansion, or a change in access to or availability of a recreational opportunity, and how the management zones would affect group and individual opportunities.

Interpretation and Orientation.

The analysis of interpretation and orientation is based on whether there would be a change in the availability of education programs resulting from management zone application or other actions.

Visitor Facilities and Services.

This analysis discusses impacts on access to visitor facilities and services provided by the National Park Service and commercial services as a result of application of the management zones and other actions.

Visitor Experience Values.

This analysis is based on whether there would be a change in opportunities for solitude, tranquility, challenge, adventure, and freedom to travel throughout the National Area.

Context

The intensity of impacts involving visitor use and experience is evaluated within a local context (i.e., project area) or regional context, as appropriate. The contribution of particular actions or management prescriptions to cumulative impacts is evaluated in a regional context.

Intensity

The intensity of the impact is based on whether the impact to visitor use and experience is negligible, minor, moderate, or major, as defined below:

- *Negligible* – A negligible effect would be a change that would not be perceptible or would be barely perceptible by most visitors.
- *Minor* – A slight change in a few visitors' experiences, which would be noticeable but which would result in little detraction or improvement in the quality of the experience.
- *Moderate* – A moderate effect would be a change in a large number of visitors' experiences that would result in a noticeable decrease or improvement in the quality of the experience. This would be indicated by a change in frustration level or inconvenience for a period of time.
- *Major* – A substantial improvement in many visitors' experience or a severe drop in the quality of many peoples' experience, such as the addition or elimination of a recreational opportunity or a permanent change in access to a popular area.

Duration

Impacts that would occur within five years or less were classified as short-term effects. Long-term effects would last for more than five years.

Impact Type

Impacts are evaluated in terms of whether they are beneficial or adverse to visitor experience. Beneficial impacts would include greater availability of recreational opportunities or educational programs, as well as other services and types of experiences. Adverse impacts would reduce access or availability to the four facets of visitor experience described above.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Socioeconomic Environment

The impact analysis evaluated the effect that park operations, tourism and recreation, and commercial services (concessions) would have on the local and regional economy under the four alternatives. The analysis of socioeconomic impacts was developed from a review of the local and regional conditions as they relate to the National Area. The potential for future development and changes in visitor use patterns was considered.

Precise quantitative analysis of potential effects on socioeconomic conditions was not feasible due to the prescriptive nature of the plan. However, it is possible to estimate the effect of possible future actions using output from the Money Generation Model & Money Generation Model II (1992, 1999). Visitation levels have fluctuated in recent years, but are generally increasing. No specific analyses were made for projecting future visitation. A generally low rate of increase has been assumed. Under the model, each additional 1,000 visits would result in measurable benefits to the local and regional economies.

The National Area provides significant economic benefits to the local economy. The fiscal year 2002 operating budget for the National Area was approximately $3,600,000 (Total includes – Salaries: $2.9 million; Utilities: $75,000; Supplies: $150,000). Using the NPS Money Generation Model for determining economic impacts, it is estimated that the direct FY ’02 spending of NPS, when combined with the expenditures of visitors to the National Area, had a combined economic impact on the local economy of between 10 and 16 million dollars.

Impact Assessment

Proposed actions and management zoning under this plan were evaluated in terms of the context, intensity, and duration of the socioeconomic impacts, and whether the impacts were considered to be beneficial or adverse.

Context

The intensity of impacts is evaluated within a local context (i.e., project area) or regional context, as appropriate. The contribution of particular actions or management prescriptions to cumulative impacts is evaluated in a regional context.

Intensity

Intensity of impact on the socioeconomic environment is defined as follows:

- *Negligible* – The impact either would be undetectable or would have no discernable effect.
- *Minor* – The impact would be slightly detectable but would not have an overall effect.
- *Moderate* – The impact would be clearly detectable and could have an appreciable effect.
- *Major* – The impact would be substantial and have a highly positive (beneficial) or severely negative (adverse) effect. Such impacts could permanently alter the socioeconomic environment.

Duration

Impacts that would occur within five years or less were classified as short-term effects. Long-term effects would last for more than five years.

Impact Type

Impacts were evaluated in terms of whether the impact would be beneficial or adverse to the socioeconomic environment. Socioeconomic effects were recognized as beneficial if, for example, they would increase the employment base or enhance the experience of park visitors (such as by providing improved services). Adverse socioeconomic impacts would negatively alter social or economic conditions in the county or region.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

Operational Efficiency

For purposes of this analysis, operational efficiency refers to the adequacy of staffing levels and the quality and effectiveness of infrastructure used in the operation of the National Area in order to adequately protect and preserve vital resources and provide quality visitor experiences. Facilities analyzed include staff work areas, visitor orientation facilities, and administrative buildings used to support National Area operations. The presence and adequacy of water, sewer, electric, and telephone utilities was also analyzed. National Area staff knowledge was used to evaluate the impacts of each alternative based on the current description of National Area facilities and operational efficiency presented in the Affected Environment section of this document.

Impact Assessment

Proposed actions and management zones under this plan were evaluated in terms of the context, intensity, and duration of impacts on National Area operational efficiency, and whether such impacts were considered to be beneficial or adverse.

Context

The intensity of impacts to National Area operations and facilities is evaluated within a local context (i.e., project area) or regional context, as appropriate. The contribution of particular actions or management prescriptions to cumulative impacts is evaluated in a regional context.

Intensity

Intensity of impact on National Area operational efficiency is defined as follows:

- *Negligible* – The change may affect National Area operations, but would be so small as to have no measurable or perceptible consequences.
- *Minor* – The change would be slightly detectable but would not have an overall effect.
- *Moderate* – The change would be clearly detectable and could have an appreciable effect.
- *Major* – The change would have substantial influence on site operations and facilities and include impacts that would reduce the National Area's ability to provide adequate services and facilities to visitors and staff.

Duration

Impacts that would occur within five years or less were classified as short-term effects. Long-term effects would last for more than five years.

Impact Type

Impacts are evaluated in terms of whether the impacts on site operations and facilities would be beneficial or adverse. Beneficial impacts would improve site operations and/or facilities. Adverse impacts would negatively affect site operations and/or facilities and could hinder the National Area's ability to provide adequate facilities and services to visitors and staff.

Direct versus Indirect Impacts

Direct effects would be caused by an action and would occur at the same time and place as the action. Indirect effects would be caused by the action and would be reasonably foreseeable but would occur later in time, at another place, or to another resource.

CUMULATIVE IMPACTS

Regulations implementing NEPA issued by the CEQ require the assessment of cumulative impacts in the decision-making process for federal actions. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative impacts analyzed in this document consider the incremental effects of the No-action Alternative and each of the action alternatives in conjunction with past, current, and future actions at the National Area. Cumulative impacts were determined by combining the effects of a given alternative with other past, present, and reasonably foreseeable future actions. The impact analysis and conclusions are based on information available in the literature, data from NPS studies and records, and information provided by experts within the National Park Service and other agencies. Unless otherwise stated, all impacts are assumed to be direct and long-term. All of the impact analyses assume that mitigating measures will be applied at the time the alternative is implemented in order to minimize or avoid impacts. Mitigating measures are described in the "Alternatives, including the Preferred Alternative" chapter of this document.

IMPAIRMENT OF NATIONAL AREA RESOURCES OR VALUES

In addition to determining the environmental consequences of the Preferred and other alternatives, the 2001 NPS *Management Policie*s and Director's Order 12 require analysis of potential effects to determine if actions would impair National Area resources or values.

The fundamental purpose of the National Park System, as established by the Organic Act and reaffirmed by the General Authorities Act, is to conserve the resources and values of each unit of the system. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on unit resources and values. However, the laws do give NPS management discretion to allow impacts to unit resources and values when necessary and appropriate to fulfill the purposes of a unit, as long as the impact does not constitute impairment of the affected resources and values. Moreover, an impact is less likely to constitute an impairment if it is an unavoidable result, which cannot be further mitigated, of an action necessary to preserve or restore the integrity of unit resources or values.

Although Congress has given NPS management discretion to allow certain impacts within individual units, that discretion is limited by statutory requirement that the NPS must leave resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgement of the responsible NPS manager, would harm the integrity of unit resources or values,

including opportunities that otherwise would be present for the enjoyment of those resources or values. Impairment may result from NPS activities in managing the unit, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the unit.

An impact to any unit resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is central to the unit's mission or critical to the unit's integrity.
To determine whether actions and management prescriptions involving National Area resources would result in impairment, each alternative was evaluated to determine if it had a major adverse effect on a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation of the National Area;
- key to the natural or cultural integrity of the National Area or to opportunities for enjoyment of the National Area; or
- identified as a goal in this General Management Plan or other relevant NPS planning documents.

TOPICS DISMISSED FROM FURTHER ANALYSIS

The following topics were dismissed from further analysis in this document, for the reasons indicated:

Socially or Economically Disadvantaged Populations. Executive Order 12898 ("Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations") requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. None of the alternatives considered in this document would result in any identifiable adverse health effects, and none of the impacts to the natural and physical environment would significantly and adversely affect any minority or low-income population or community. Therefore, environmental justice was dismissed as an impact topic.

Prime and Unique Agricultural Lands. Council on Environmental Quality regulations require that federal agencies assess the effects of their actions on farmland soils classified by the U.S. Natural Resource Conservation Service (NRCS) as prime or unique. According to NRCS, none of the soils in the project area are classified as prime or unique. Therefore, this topic was dismissed from further consideration in this document.

Indian Sacred Sites. Executive Order 130007 ("Indian Sacred Sites") requires all federal agencies to determine whether their proposed actions would restrict access to or ceremonial use of Indian sacred sites by Indian religious practitioners or adversely affect the integrity of such sacred sites. None of the alternatives considered in this document would restrict access to any sites sacred to American Indians or limit ceremonial use of any such sites. Components of the plan designed to achieve enhanced management of cultural resources and a reduction in illegal relic hunting would have an overall beneficial effect on any Indian sacred sites. Therefore, this topic was dismissed from further consideration in this document.

NO-ACTION ALTERNATIVE (Alternative C)

NATURAL RESOURCES

Geology, Physiography, and Soils

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the No-action Alternative, geological, physiographical, and soil resources would be subject to current management practices and policies. No new programs would be undertaken to address threats to soil resources. These threats stem in large part from poorly designed and sited trails, many of which are located on old, incised logging and mining roads. Moderate to major adverse impacts to soils in the form of extensive soil erosion and exposed bedrock would continue to occur on heavily used horse trails, especially in steep areas between the plateau and gorge bottom. Impacts would be exacerbated by a lack of adequate maintenance. Moderate adverse impacts would also continue to occur at creek crossings and horse fords along the river. In some areas, such as Station Camp, large sediment loads would continue to affect streams.

Visitor activities such as camping, hiking, climbing, OHV use, and horseback riding would increase slightly and continue to have localized effects on soils. Visitors would continue to overuse some facilities such as certain trails and also use inappropriately, and in some cases illegally, certain sensitive, readily accessible resources such as rock shelters and arches. In previously undisturbed areas, human trampling would result in vegetation loss followed by soil compaction and erosion. Social trails on sloping hillsides would act as channels for surface water runoff, resulting in soil erosion. OHV use would continue to cause erosion on steep areas and at stream crossings. Increased climbing activities on bluff faces would cause soil loss at the base and edges of cliffs.

NPS policy prohibits the surface mining of soil, gravel, or rock materials for any park operations purposes, including the building of roads or facilities. Most maintenance activities for existing access roads, trails, and developed sites would be limited to existing disturbed areas and would not likely involve blasting or other modification of bedrock geology. The potential impacts to geologic resources from road or facility maintenance or NPS operations would thus be negligible. In contrast, visitor activities have the potential to adversely impact sensitive geologic resources such as rock shelters, arches and chimneys. Under the No-action Alternative, these features would be subject to current management practices for sensitive geologic resources. Due to limited staffing and resources and the absence of express management prescriptions, adverse impacts would continue to occur. The impacts on these geologic features would be minor to moderate, long-term and adverse.

The nature and extent of soil compaction and erosion under the No-action Alternative would depend upon the amount, timing, type, and location of use. For example, soils are most susceptible to damage during spring when soils are water saturated and prone to disturbance. In some high-use areas, such as Bandy Creek, there would be moderate adverse impacts, as repeated trampling resulted in high plant mortality and increased erosion potential. In problem sites, the NPS staff would continue attempts to prevent and reduce impacts and to restore damaged sites. However, current efforts would not prevent or reduce all impacts under current visitation levels. Thus, increased impacts are expected as visitation increases.

In other locations of the National Area, there would be negligible to minor adverse impacts on soils as relatively few plants, in localized areas, would be affected by trampling and other disturbance. The potential for soil erosion in these areas would be negligible.

Increased parking by visitors in non-designated vegetated areas would cause loss of vegetation, which would contribute to soil erosion. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Actions outside the park have resulted in, and would be likely to continue to result in, minor to major long-term adverse effects on soils in the vicinity of the National Area, such as the New River area and the Bear Creek watershed. In particular, logging, mining, oil and gas extraction, and commercial and housing developments on lands outside the National Area boundary have had (and would continue to have) erosive effects on soils along the boundary.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection to undisturbed soils. However, these efforts would not diminish the effects of development in the near term on localized areas.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the potential for soil erosion. Because these actions would affect small, localized areas, their long-term beneficial effects would be minor.

Past projects undertaken within the National Area that would affect soils include installation and maintenance of roads, trails, and developed sites. Inadequate maintenance for these projects would continue to occur as a result of insufficient funding and staff. The result would be long-term, moderate to major impacts to soils in some locations.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts of all of these actions would likely be minor to major, long-term and adverse impacts on soils in the region, primarily because of the effects of oil and gas extraction, logging, and land development outside of the National Area.

The No-action Alternative would make a minor contribution to these cumulative impacts. This minimal contribution results from the relatively small areas of disturbed soils in the National Area, as well as NPS' commitment to ensuring the protection of soils and geologic resources as an integral component of the National Area.

Conclusion. Increased visitor activities mostly would result in localized, minor, long-term adverse impacts on soils and geologic resources, with moderate to major impacts in some high use areas and areas susceptible to severe erosion. Impacts would include increased soil compaction in some visitor use areas and exposed bedrock on various steep trail sections. There also probably would be minor to major long-term cumulative adverse impacts on soils and geologic resources in the region, primarily due to logging, mining, oil and gas extraction, and land development. This alternative's contribution to these cumulative impacts would be minor.

The No-action Alternative would perpetuate the above-mentioned conditions As a result, this alternative would, over time, result in moderate to major, adverse impacts to certain geologic features particularly, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would, over time, result in impairment to certain geologic, physiographic, and soil resources of the National Area.

Water Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. The land uses in the watershed described in the Affected Environment section present serious problems for meeting required management for water quality. As a result, adverse impacts on water quality

would continue under the No-action Alternative, due to increases in levels of sediment, pollutants, and nutrients in the water. In addition, acid mine drainage from past mining activities inside and outside the National Area would continue to impair the water quality of some Area streams. These effects would be amplified by the impacts associated with increased visitor use of the National Area.

A number of roads and trails in the National Area do not presently meet accepted standards for facility design and location. These roads and trails are susceptible to greater rates of erosion than is typical for properly designed facilities of this type. The result is a reduction in water quality in Area streams due to excessive sedimentation. Under the No-action Alternative, present levels of sedimentation would continue, and possibly worsen, as poorly designed sections of road and trail continued to deteriorate. Moderate to major adverse impacts to water quality in the form of excessive sediment loads would continue to occur in the vicinity of heavily used horse trails, especially in steep areas between the plateau and gorge bottom. Major stream crossings such as Station Camp and Big Island would also be affected by excess sedimentation. Impacts would be exacerbated by a lack of adequate maintenance.

Visitor activities such as camping, hiking, OHV use, and horseback riding would increase slightly and would continue to have localized, indirect effects on water quality due to increased soil compaction, vegetation trampling, and consequent loss of vegetation in some areas. These effects would lead to greater erosion and the addition of sediment to adjacent waters. The nature and extent of soil compaction and vegetation damage, and therefore, of related impacts on water quality, would depend on the types of local soils, vegetation and topography, as well as the areal extent, duration, and intensity of use. On the whole, sedimentation effects generally would be slight in comparison to the natural sedimentation occurring as a result of runoff from precipitation and flood flows. Therefore, sedimentation-related impacts on water resources from visitor use would be negligible to minor. As noted above, however, areas adjacent to improperly sited and inadequately maintained roads and trails, could experience moderate to major impacts to water quality.

The increased use of unpaved roads could make these facilities more susceptible to surface erosion and runoff. Vehicle use along roads and in parking lots would continue to deposit petroleum products that could be washed into adjacent waters. Impacts would generally be minor due to mitigation techniques such as placement of sediment traps and and/or biofiltration (vegetation filtration) along roadsides.

At present, oil and gas development is poorly regulated within the National Area and many wells are not in compliance with state and federal standards. Impacts to water quality appear to be minor for now, but increases in drilling activity (as is presently happening at nearby Obed Wild and Scenic River) could result in moderate to major adverse impacts if these operations are not better managed. Under the No-action Alternative, National Area staff would continue to lack adequate resources to oversee oil and gas operations and insure compliance with existing regulations. The potential for adverse impacts is magnified by the fact that many wells are located near the edge of the gorge. Poor compliance could result in impacts to water quality that are long-term, moderate to major, and adverse.

Improper disposal of untreated human waste in areas without toilet facilities currently causes minor water quality problems. Under the No-action Alternative, this problem would increase proportionately with increased human use of the area.

Cumulative Impacts. Actions outside the National Area would result in minor to major adverse effects on water quality due to increased loading of sediment, nutrients, chemical pollutants, and pathogens.

- acid mine drainage would have moderate to major long-term adverse effects on water quality in some areas and continue to impair some streams in the National Area.
- Logging and timber harvesting would have moderate to major short-term adverse effects on water quality. These would result from sediment entering rivers and streams that originate outside the National Area.
- Runoff from existing and new developments in the area would have minor to moderate long-term adverse effects on water quality in rivers and streams originating outside the National Area.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for water quality and water resources. However, these efforts would not diminish the effects of development in the near term.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the entry of sediments into local waters. This would affect small, localized areas and would have, overall, a moderate beneficial effect.

Past projects undertaken within the National Area that would affect water quality include installation and maintenance of roads, trails, and developed sites. Ongoing maintenance for these projects would have minor short-term adverse impacts on water quality resulting from small increases in sediment and other pollutants. Continued adherence to best management practices would ensure that the impacts were minor.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts would be moderate to major, long-term, and adverse in the region, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.

The No-action Alternative, viewed in a region-wide context, would make a minor contribution to these cumulative impacts. This minimal contribution results from the mandate of the National Park Service to protect resources within the National Area, as well as NPS' commitment to mitigate even minor water quality impacts through such measures as trail maintenance and rehabilitation.

Conclusion. Improperly sited and inadequately maintained roads and trails would continue to have a moderate to major impact on water quality within the National Area by increasing sediment loads in receiving streams. Increasing visitor use in the National Area would have a minor adverse impact on water resources and water quality by increasing levels of sediments, vehicle-related pollutants, and nutrients in rivers and streams. Most of these effects would be localized. Oil and gas development within and adjacent to the boundary of the National Area would increase the amount of disturbed area, thereby contributing increased sediment and polluted runoff to adjacent streams. Because of the inadequate regulatory control in place for these operations, the long-term adverse impacts of these operations on water quality, while presently minor, could increase over time as more wells are drilled within the National Area. There would be moderate to major, long-term and adverse cumulative impacts in the region, primarily because of pollutant loads in runoff associated with logging, oil and gas development, and land development outside the National Area. This alternative's contribution to these adverse cumulative impacts would be minor, at least in the short term.

Existing conditions are causing major adverse impacts to water quality in certain portions of the National Area. The No-action Alternative would perpetuate these conditions. As a result, this alternative would result in major, long-term and adverse impacts to some water resources or values, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would result in continued impairment to some water resources in the National Area.

Floodplains

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the No-action Alternative, impacts would be associated with the continued need to maintain existing roads, trails, parking areas, and stream crossings in the floodplain. These facilities are exempt from NPS policies on floodplain management (Director's Order 77-2; NPS Floodplain Procedures Manual 77-2). No

new developments would occur in regulatory floodplains under this alternative. Therefore, only negligible adverse impacts would occur under the No-action Alternative.

Cumulative Impacts. There are numerous projects on lands outside the National Area that could affect floodplains of the Big South Fork and its tributaries. Ongoing commercial logging, mining and oil and gas extraction activities and associated road developments have had moderate impacts on floodplains and river processes in the area. Permanent roads developed for access to logging, mining, and oil and gas extraction areas cross floodplains and have created permanent alterations that will continue to have adverse impacts on floodplain values. The No-action Alternative would not contribute to these cumulative impacts.

Conclusion. This alternative would result in negligible long-term adverse impacts on floodplain values throughout the National Area. Cumulative impacts would include moderate adverse long-term effects on floodplains because of actions outside the National Area. This alternative's contribution to these impacts would be negligible.

This alternative would not result in major, adverse impacts to any floodplain resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the floodplain resources of the National Area.

Wetlands

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. No actions would be taken under this alternative that would directly affect wetlands. Existing practices that prevent indirect impacts on wetland areas would continue.
Cumulative Impacts. Wetlands on both public and private lands in the vicinity of the National Area have been modified by logging, mining, and other development. Although the Clean Water Act requires that long-term impacts on wetlands be mitigated through wetland restoration or the creation of replacement wetlands, there has been a moderate, long-term, adverse cumulative impact on wetlands in the region. The No-action Alternative would not contribute to this cumulative impact.

Conclusion. This alternative would not cause any new impacts on wetlands. Although there would be a moderate, long-term, adverse cumulative impact on wetlands in the region, this alternative would not contribute to this impact.

This alternative would not result in major, adverse impacts to any wetland resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the wetland resources of the National Area.

Air Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the No-action Alternative, visitor use is expected to increase slightly, resulting in slight increases in vehicle miles traveled in the National Area and surrounding areas. The resulting increase in

vehicular emissions, coupled with a slight increase in the number of campfires, would likely result in increased emissions of particulates, carbon monoxide, and volatile organic compounds.

Cumulative Impacts.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for air quality. However, these efforts would not diminish the effects of development in the near term.

Past projects undertaken within the park that would affect air resources include the use and maintenance of new and existing dirt roads. These actions would continue to have minor short-term adverse impacts on air quality resulting from small increases in dust and other pollutants. Continued adherence to best management practices would ensure that the impacts were minor.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative effect of these actions would be a minor, long-term, and adverse impact on air quality, and a minor, long-term, and adverse impact on visibility in the region. These impacts would be primarily due to increased vehicular emissions and the effects of ongoing land development outside of the National Area. The No-action Alternative would make a minor contribution to these cumulative impacts.

Conclusion. The No-action Alternative would result in a negligible to minor impact on local air quality, due to slight increases in pollutants from vehicle exhaust and campfires. Cumulative impacts would include minor, long-term and adverse impacts on regional air quality, as well as minor, long-term and adverse impacts on regional visibility. This alternative's contribution to these regional impacts would be negligible to minor.

This alternative would not result in major, adverse impacts to any air resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the air resources and values of the National Area.

Vegetation

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Throughout most of the National Area, increased visitor use associated with this alternative would result in negligible to minor long-term adverse impacts on vegetation. Moderate long-term adverse impacts would occur in high-use areas.

Visitor activities such as camping, hiking, OHV use, and horseback riding would increase slightly and continue to have localized effects on vegetation. ATV use would continue to destroy vegetation in areas where riders go around mud holes and downed trees, or create new unauthorized trails. Some trails would remain poorly located in relation to sensitive plant communities, and in other areas (e.g., rock shelters) social trails created by hikers and horseback riders would continue to impact vegetation. In undisturbed areas, human trampling would bend or break aboveground plant parts. Trampled vegetation makes a site easily recognizable as an informal (social) trail or campsite, often contributing to an increase in human use. Repeated use of these newly disturbed areas, as well as previously disturbed areas, would result in vegetation loss.

The nature and extent of vegetation loss under the No-action Alternative would depend upon the amount, timing, type, and location of use. For example, vegetation is most susceptible to damage during spring when plants are initiating growth. Many plant species are unable to generate new growth following repeated

trampling, and vegetation loss occurs quickly. In high-use areas, this plant mortality would result in continued degradation even after recreational use ceased.

In some high-use areas such as Twin Arches, there would be moderate adverse impacts, as repeated trampling resulted in high plant mortality. In problem sites, the NPS staff would continue attempts to prevent and reduce impacts and to restore damaged sites. However, current efforts would not prevent or reduce all impacts under current visitation levels. Thus, increased impacts are expected as visitation increases.

In other areas of the National Area, there would be negligible to minor adverse impacts to vegetation as relatively few plants, in localized areas, would be affected.

A number of special plant habitats occur in the National Area, including rock shelters, cliff areas, and gravel/cobble bars along the river. These habitats harbor rare and unusual plant communities that are particularly susceptible to human impacts. Existing uses are impacting a number of these communities, especially at Station Camp and Big Island. Various plant species are being affected, including plants listed as threatened or endangered by state and federal authorities. Under the No-action Alternative, increased visitation and lack of protective efforts in some areas would continue to have adverse impacts on a number of rare, threatened and endangered plants.

Increased visitor use might help spread exotic (non-native) or noxious species as a result of seeds being carried into the National Area on vehicles, horses, clothing, maintenance equipment, and other materials. Impacts would range from minor to moderate, depending on the type of plant and where it was introduced. Moderate impacts would occur if a local population of a species or plant community were sufficiently affected to cause a change in its abundance or distribution.

Dust and pollutants from motor vehicles in the area would increase slightly and continue to affect vegetation adjacent to roadways by interfering with plant respiration and causing plant decline in leaves. Increased parking by visitors in vegetated areas would cause loss of vegetation, which might lead to invasion by noxious weed species. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Actions outside the park have resulted in, and would be likely to continue to result in, minor to major long-term adverse effects on vegetation in the vicinity of the National Area, such as the Bear Creek watershed. In particular, logging, mining, oil and gas extraction, and commercial and housing development on land outside the National Area have had (and would continue to have) edge effects on vegetation along the boundary, such as changes in species composition due to clearing, windthrow, changes in light regime, and infestations of non-native plants and exotic pests.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for undisturbed vegetation. However, these efforts would not diminish the effects of development in the near term.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the potential for invasion by exotic plants. Because these actions would affect small, localized areas, their long-term beneficial effects would be minor.

Past projects undertaken within the National Area that would affect vegetation include development and maintenance of roads, trails, and developed sites. Rehabilitation and maintenance of these facilities would continue to cause minor short-term adverse impacts on vegetation due to their limited scope, the use of best management practices to control vegetation disturbance during installation, and prompt revegetation after project completion.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts of all of these actions impacts on vegetation in the region would likely be minor to major, long-term and adverse, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.

The No-action Alternative would make a minor contribution to these cumulative impacts. This minimal contribution results from the relatively small areas of disturbed vegetation in the National Area, as well as NPS' commitment to ensuring the protection of vegetation as an integral component of the National Area.

Conclusion. Increased visitor activities would result in localized, minor, long-term, and adverse impacts on vegetation, with moderate impacts in some high use areas such as Bandy Creek, Twin Arches, and Blue Heron. Impacts would include trampled vegetation, loss of plants, and the spread of exotic species. There also probably would be minor to major long-term cumulative adverse impacts on vegetation in the region, primarily due to mining, logging, oil and gas extraction, and land development. This alternative's contribution to these cumulative impacts would be minor.

Existing usage patterns may be causing major adverse impacts to vegetative resources in certain sensitive areas of the National Area. The No-action Alternative would perpetuate these conditions. As a result, this alternative could, over time, result in major, adverse impacts to some vegetation resources, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning documents. Therefore, the environmental impacts associated with this alternative could, over time, result in impairment to some vegetation resources in the National Area.

Terrestrial and Aquatic Animal Life

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under this alternative, a slight increase in visitor use would result in increased recreational activity, vehicular traffic, and development, with corresponding impacts to terrestrial and aquatic animal life.

Most visitor use is concentrated in the center of the National Area. Increased human presence in these areas would result in some additional disturbance to wildlife. However, because these areas are already heavily used, it is doubtful that slight increases in human activity would noticeably increase impact to wildlife and wildlife habitat in these areas. Wildlife sensitive to human use already avoid these areas, and animals that do inhabit such locations would be accustomed to human use and would not be further impacted by additional human usage. To the extent that wildlife was disturbed, it would be temporary and would not affect local or regional populations. Therefore, the impacts to wildlife, though adverse, would be negligible. On the other hand, increased access and visitation could affect fish populations in some small streams.

Increased use would result in a proportional increase in improper food storage by visitors. Food and garbage left out attracts wildlife, resulting in animals associating food with people and possibly causing human-wildlife conflicts. Some visitors would continue to feed wildlife, which would also condition wildlife to associate humans with food. Existing wildlife management practices, such as providing wildlife-resistant garbage cans and educating visitors, would continue to be implemented, resulting in negligible to minor impacts.

Slightly increased visitation levels may result in more hunting and fishing pressure in the National Area. All hunting and fishing activities are governed by regulations issued by the states of Tennessee and Kentucky. (Note: the National Area has the authority to develop its own hunting and fishing regulations in consultation with the states, and may do so at some future time.) Because the harvest limits set by existing regulations are based, in part, on anticipated hunting pressure, only negligible to minor impacts on local and regional populations would occur.

Wildlife are occasionally injured or killed by motor vehicles on park roads, and this impact might increase slightly with additional motor vehicle travel. These adverse impacts would be minor because they would affect individuals, not entire populations.

Cumulative Impacts. Outside the National Area, the conversion of wildlife habitat to commercial and residential development would continue to result in adverse effects on wildlife and fish. In addition, land development would fragment remaining habitat, making it less suitable to support species that are sensitive to the presence of humans.

The effects of continued timber harvesting in areas with existing roads would be short-term, adverse, and minor to moderate. Animals would be displaced during harvesting operations, and land would have a diminished ability to support wildlife until vegetation was re-established. Thereafter, the creation of "edge" and early successional stages would improve the habitat for species that require this habitat, including such game species as deer and elk, while degrading the habitat of forest interior species such as certain types of neotropical migratory birds.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for wildlife habitat. However, these efforts would not diminish the effects of development in the near term.

Other actions taken by the National Park Service in the National Area, such as replacing bridges or rehabilitating roads and trails, could result in some loss of individuals or habitat. Effects during build-out would be minor, short-term, and adverse. Habitat restoration after completion would prevent long-term effects.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts of all of these actions would likely be minor to major, long-term and adverse, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.

The No-action Alternative would make a minor contribution to these cumulative impacts because the adverse impact within the National Area would be small and because of the large area of habitat loss or degradation that would occur outside of the National Area boundary.

Conclusion. Increased visitor activities associated with the No-action Alternative would cause negligible to minor long-term adverse impacts on wildlife. Impacts would be associated with increased visitor use displacing or disturbing wildlife, conditioning wildlife to associate humans with food, and injuring or killing wildlife in collisions with motor vehicles. Cumulative effects would include minor to major long-term adverse impacts, primarily due to habitat loss associated with oil and gas extraction, logging and land development outside the boundary. This alternative's contribution to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any terrestrial or aquatic wildlife resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the terrestrial or aquatic wildlife resources of the National Area.

Special Status Species

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. The No-action Alternative would likely result in continued negative impacts to special status species, including five species of mussels on the federal endangered species list. Increased use of horse crossings at Station Camp and Big Island would likely result in continued mortality of individual special status mussels in these areas, thereby having a potential adverse effect on federally listed species. Other species of concern are aquatic species, including the duskytail darter, and plants listed as threatened or endangered by

state and federal authorities. Increased use of existing trails would likely result in continued adverse impacts in some locations to sensitive vegetation communities and special status plant species.

Site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the National Park Service would consult with the U.S. Fish and Wildlife Service and the states of Tennessee and Kentucky to determine mitigation measures to avoid or minimize adverse impacts on the species.

The potential impacts on most special status species from the implementation of the No-action Alternative would be associated with increased human use of the National Area and lack of enforcement capability.

Cumulative Impacts. Mining, oil and gas extraction, timber cutting, and development activities on privately owned lands outside the National Area are of particular concern because they would continue to result in the degradation of water quality, thereby affecting mussel populations.

Land development, mining, oil and gas extraction, and timber harvesting would continue to adversely affect special status species outside the National Area through such mechanisms as habitat loss, habitat degradation (for example, altered water temperature and flow) and increased sedimentation.

Other actions taken by the National Park Service in the National Area, such as replacing bridges or rehabilitating roads and trails, could result in some loss of individuals or habitat. Because the National Park Service would conduct pre-project surveys and implement mitigation, these actions would not be likely to have long-term adverse effects on any special-status species.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts of all of these actions would likely be an adverse effect on special-status species, primarily because of the impacts of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area. The No-action Alternative would make a negligible to minor contribution to this cumulative impact.

Conclusion. Continued human use, along with expected increases in visitor use of the National Area, would cause disturbance to individuals of special-status species. Impacts to mussels from horse crossings would continue to be addressed through the use of route-flagging, but long-term impacts from continuing individual mortality could occur.

For activities in other locations, specific survey, avoidance, and mitigation actions taken by the National Park Service would ensure that the No-action Alternative would minimize adverse impacts on any federally or state listed species

The effects of actions by others and other actions in the National Area, when combined with the impacts of actions under this alternative, would be likely to adversely affect special status species. The No-action Alternative would contribute to this cumulative effect in the case of special status mussels.

Over the long term, the environmental impacts associated with this alternative could result in impairment to special status species of the National Area.

CULTURAL RESOURCES

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Archeological Resources

Analysis. Under the No-action Alternative, archeological resources would continue to experience adverse impacts. At present, the National Area has had numerous archeological surveys done to identify and define the archeological resources that can be found within the boundary of the National Area. One of these surveys was a five-year survey designed to produce predictive models for archeological site locations in all of the National Area environmental zones. The other archeological surveys were site-specific project surveys at proposed development locations. These surveys and ongoing archeological site protection efforts indicate that, far and away, the greatest threat to archeological resources in the National Area is illegal relic collecting. Archeological site destruction through relic collecting is also occurring at an accelerated pace on most of the public lands surrounding the National Area (Daniel Boone National Forest, Scott State Forest, Picket State Forest, etc.).

Disturbance can also result from building and maintenance activities and unrestricted visitor access to areas of known sensitivity for archeological resources. Visitor access impacts can include disturbances caused by overflow parking along roadside and trailhead areas, the creation and use of social trails, and occasionally the use and maintenance of existing trails.

Some prehistoric archeological sites are known to be located near areas of high public use and visibility, such as rock shelters and arches. Some of these have sustained impacts from both natural and human caused erosion, a consequence of pedestrian and equestrian traffic on both designated and social trails. The increase in visitors anticipated under the No-action Alternative would continue the human-caused erosion of these sites or other known or unknown prehistoric sites.

NPS staff would continue established resource protection measures for the identification and treatment of archeological resources on a case-by-case basis. NPS would coordinate with the relevant State Historic Preservation Officer regarding appropriate response actions and mitigation measures. Where potential impacts are identified, possible mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations.

Cumulative Impacts. Cumulative impacts on archeological resources are considered on a region-wide basis because prehistoric and historic activity in the Big South Fork region was not limited to the lands within the National Area boundary.

Actions outside the National Area include a variety of land disturbing activities, including mining, logging, oil and gas extraction, and development projects. Because of the large acreage involved, it is likely that numerous sites would continue to be impacted. If any of these actions require permits from state or federal agencies, recordation may be required. However, it is likely that many archeological resources will be destroyed without knowledge, causing an adverse effect.

Conclusion. Established resource protection measures for the identification and treatment of archeological resources would continue on a case-by-case basis. More visitation, which could result in continuing erosion of some archeological sites, would have minor to moderate adverse effects. When actions external to the National Area are considered in conjunction with this alternative and other actions inside the National Area, there would be a major, long-term, and adverse cumulative effect on archeological resources, primarily because of development outside of the National Area that would impact sites without recordation. The No-Action Alternative would make a minor to moderate contribution to this adverse effect.

Over the long term, the environmental impacts associated with this alternative could result in impairment to archeological resources of the National Area, as archeological sites continue to succumb to weathering, neglect, and intensified human use.

Ethnographic Resource*s*

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. After the National Area was established, acquisition of land by the federal government resulted in the relocation of families and individuals away from their traditional homesites. Relatives of many of these people still live in the surrounding area. However, the National Area's enabling legislation resulted in the closure of most roads into the gorge. As a result, many local residents are prevented from having traditional motorized access to various sites of interest. Lack of use has resulted in the natural succession of many sites to forest.

The gorge will remain closed to most motorized access under all of the alternatives, in accordance with the dictates of the enabling legislation. Continued closure will result in moderate to major, long-term and adverse impacts to persons deprived of motorized access to traditional use sites. However, these impacts will not be attributable to the alternatives per se, but stem from legislative requirements.

Under the No-action Alternative, certain sites will continue to be preserved and interpreted for visitors, including the Oscar Blevins, Lora Blevins and John Litton farmsteads. Other traditional use sites are designated for continuing use, such as the Burnt Mill Bridge. In addition, oral histories will continue to be accumulated to document past residents' observations and experiences.

Cumulative Impacts. Cumulative impacts on ethnographic resources are considered on a region-wide basis because historic activity in the Big South Fork region was not limited to the lands within the National Area boundary.

Actions outside the National Area include a variety of land disturbing activities, including mining, logging, oil and gas extraction, and development projects. Because of the large acreage involved, it is likely that many ethnographic resources have been and will continue to be destroyed, causing an adverse effect.

When other actions external to the National Area and on private land inside the boundary are considered in conjunction with this alternative, the cumulative impacts on ethnographic resources would be major, long-term, and adverse, primarily because of development outside of the National Area that would impact ethnographic resources. The National Area's enabling legislation would continue to result in a moderate, long-term and adverse impact on ethnographic resources, primarily because of the large area within the gorge that would remain closed to motorized vehicles. The No-action Alternative would merely implement the closure requirement of the legislation, but would not otherwise contribute to this adverse effect. In fact, the mitigating measures adopted by the National Area require avoidance and protection of ethnographic resources. Therefore, the No-action Alternative would be expected to preserve some ethnographic resources for the region.

Conclusion. Establishment of the National Area required closure of most of the gorge to motorized access, resulting in moderate to major, long-term and adverse impacts to ethnographic resources. However, various sites and ethnographic resources within the National Area are being actively used or protected and interpreted for visitors, and these activities would continue under the No-action Alternative. The impacts of these activities on ethnographic resources would be minor to moderate, long-term and beneficial.

Historic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the No-action Alternative, historical resources would continue to be stabilized and protected as required by law. However, no direction for future use and interpretation of these resources would be developed and their educational potential would go unrealized. Because no new studies of historical resources would be undertaken, the result would be a lack of data upon which to base decisions, thereby inhibiting the

proper identification, treatment, and management of historic resources. In addition, there would be a continued deterioration and loss of the historic fabric as a result of natural deterioration and ongoing human interaction.

This alternative would not include any major new development or major changes that would affect historic resources. The National Area staff would continue to implement established resource protection measures for the treatment of historic resources on a case by case basis. Where appropriate, NPS would coordinate with the relevant State Historic Preservation Officer regarding response actions and mitigation measures. Treatment measures for historic resources would continue to conform to the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties*, 36 CFR section 68. However, as structures aged and more visitors to the National Area encountered historic structures, the potential would exist for increasing impacts.

Cumulative Impacts. Cumulative impacts on historic resources are considered on a region-wide basis because they extend beyond the National Area boundary.

Actions outside the National Area that could affect historic resources are the same as those identified for archeological resources. Specific impacts on historic resources outside the boundary are unknown. However, it is likely that numerous historic sites have been affected, and would continue to be adversely affected, because of the large acreages impacted by mining, logging, oil and gas extraction, and development projects. In instances where these actions are permitted by state or federal agencies, recordation may be required. However, it is likely that many historic resources have been and will continue to be destroyed without knowledge, resulting in an adverse effect. Although region-wide impacts have had a cumulative adverse effect on historic resources, they have not directly affected the structures eligible for listing on the National Register or the four component landscapes identified by the NPS Cultural Landscapes Program.

When other actions external to the National Area are considered in conjunction with this alternative and other actions inside the National Area, the cumulative impacts on historic resources would be major, long-term, and adverse, primarily because of the effects of logging, mining, and land development outside the National Area. The contribution of the No-Action Alternative to this adverse effect would be minor to moderate. Despite the fact that ongoing preservation and maintenance of historic buildings and structures would continue, and even though this alternative would be expected to preserve some historic resources for the region, the rate of loss of historic resources in the National Area would be such as to make a minor to moderate contribution to adverse cumulative impacts in the region.

Conclusion. Adverse effects to historic resources would continue under the No-action Alternative. Regionwide development activities would continue to have a cumulative adverse effect on historic resources. The No-action Alternative would make a minor to moderate contribution to the regionwide cumulative adverse effect.

The environmental impacts associated with this alternative could result in impairment to historical resources of the National Area, as historic resources continue to succumb to weathering, neglect, and intensified human use.

VISITOR USE AND EXPERIENCE

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the No-action Alternative, a variety of natural and cultural features would remain readily available for visitor use, including the river, canyon rim views, and certain historic sites. Many other features would likewise be available depending on visitor interests and abilities. However, access to locations in the National Area is a function of available roads and trails, which are located in areas and maintained in conditions that sometimes limit access to certain resources. These limitations on access would remain under the No-action Alternative.

As provided by the legislation establishing the National Area, access to game for hunting, trapping, and fishing would continue under joint federal and state management. However, motor vehicle access to many sites in the gorge would remain largely curtailed due to legislative restrictions.

In areas outside the gorge, OHV use would continue on various roads and trails customarily used for this type of recreation. Persons seeking this type of recreation would continue to have these opportunities, but conflicts with other users would persist, especially over such issues as noise and resource impacts.

Public education programs and exhibits would continue to be provided on- and off-site on a variety of resource-related subjects. General, informal outreach to the communities by National Area personnel would continue to assist in maintaining a dialogue concerning issues of mutual interest. However, in the absence of additional interpretive or outreach efforts, many segments of the public would be unaware of the nature and importance of Area resources, the public's role in protecting these resources, and the reasons for certain management actions.

Visitors would continue to have access to concessioner services, especially at the Charit Creek Lodge and the Station Camp and Bandy Creek horse camps. However, the experiences concessioners could offer would be limited due to a lack of connections between existing horse trails and gaps in the projected route of the John Muir Trail.

Uncrowded areas and solitude would remain widely available, but would diminish slightly over time as visitation levels increased. In addition, the difficulty of maintaining over 600 miles of roads and trails would continue, thereby contributing to a decline in visitor experience quality. Existing use-sharing of trails would continue, generating conflicts among user groups and resulting in further adverse impacts on the visitor experience.

Overall, the impact of this alternative on visitor use and experience would be minor, long-term, and adverse.

Cumulative Impacts. Development projects in the vicinity of the National Area could bring additional visitors to the general area. This could increase visitation to the National Area, especially during peak travel seasons. Cumulative impacts would be minor to moderate for visitors seeking an uncrowded, unconfined outdoor experience.

When the cumulative impacts of actions by others are combined with impacts associated with this alternative, there would be minor long-term cumulative adverse impacts on visitor use and experience.

Conclusion. The general character of the National Area would not change under the No-action Alternative. The No-action Alternative would continue to provide visitors an opportunity for solitary experiences, and for more social forms of recreation and experience as well. The existing levels of visitor facilities would be continued with no plans for expanded educational or research programs. As visitation levels increase, the quality and diversity of visitor experience would likely decrease over time. Conflicts among user groups would continue and could grow worse over time. Depending on location in the National Area and visitor preferences, this alternative would have minor to moderate, long-term and adverse effects on visitor use and experience.

SOCIOECONOMIC ENVIRONMENT

Operation of the National Area

Analysis. Under the No-action Alternative, the National Area would continue to be managed according to current policies. The No-action Alternative would not result in the development of major new facilities at the National Area or an increase in employment. Therefore, there would be no direct incremental increase in impact on the local and regional economy from operation of the National Area, over and above what currently exists. However, nearby communities would continue to experience direct benefits of expenditures by NPS for supplies and by individual NPS employee purchases. National Area employee salaries currently total

approximately $2.9 million, which directly benefits the local economy. Impacts would thus be moderate, long-term, and beneficial.

Cumulative Impacts. The lands around the National Area, particularly those areas near Oneida and Jamestown, Tennessee and Whitley City, Kentucky, would be affected by continued regional growth. Development activities outside the boundary could result in more concentrated residential and commercial development near the National Area, and also stimulate growth in tourism. The effects of growth in the regional context could have both beneficial impacts, such as increased income and employment, and adverse impacts, such as increased cost of housing and greater levels of pollution and congestion. Overall, development in the region would be likely to have moderate to major adverse and beneficial socioeconomic effects on the regional economy.

The No-action Alternative would not result in significant increases in employment or expenditures in a regional context. Existing economic impacts arising from operation of the National Area would continue, with slight increases possible. In a regional context, the impact of this alternative would be minor to moderate, long-term, and beneficial. Therefore, this alternative would make a minor to moderate contribution to cumulative impacts.

Conclusion. Under this alternative, socioeconomic impacts to the local area would reflect existing conditions and hence would be moderate, long-term, and beneficial. Although there would probably be moderate to major adverse and beneficial cumulative impacts on the economy from regional growth, the impact of essentially unchanged National Area operations on the regional economy would be minor to moderate under the No-action Alternative.

Tourism and Recreation.

Analysis. Under the No-action Alternative, people would continue to visit the region in increasing numbers, and indirect benefits would continue to occur from visitors' spending for goods and services. Gateway communities would continue to experience positive cyclical increases in business related to tourism. The local tourism industry would depend in part on, and benefit from, visitors attracted to the National Area, and the National Area would continue to be an important attraction in the area. Regional governments, businesses, and organizations would continue to promote the National Area as a destination for outdoor-related recreation. However, the overall impact of the National Area on gateway communities or the regional area would not change importantly under this alternative, with modest increases in visitation likely resulting in modest increases in visitor expenditures in the gateway communities. Therefore, the No-action Alternative would likely continue to have a moderate beneficial impact on the local and regional tourism economy.

Disagreement exists as to the amount, or level, of benefits the region should be experiencing from tourism at this point in time. The numbers of visitors to the National Area predicted by a 1974 study have not materialized nor have the predicted benefits. Some believe this is because facility development in the National Area is not complete, and others believe this is because the communities have not responded to the opportunity by providing more services. In fact, a number of assumptions from the early study were not reflected by the National Area as authorized by Congress. Consequently, the National Area as authorized was significantly different from the 1974 study proposal. Regardless, the area remains largely unknown to many potential visitors, although this is changing, and will continue to change under the No-action Alternative.

Currently, the numbers of visitors coming to the National Area are coming with the expectations of certain conditions, facilities, and experiences. It is unknown how long these can continue to be offered at an acceptable level of quality. Thus, while this alternative assumes a slight increase in visitation in line with current trends, it is possible that present visitor numbers could decrease as National Area personnel find it increasingly difficult to provide visitor satisfaction. Should quality decline, visitation may also decline along with associated benefits to the economy.

Cumulative Impacts. The No-action Alternative would have a moderate effect on tourism to the region as a whole. Therefore, in a regional context this alternative would make a moderate, beneficial contribution to cumulative impacts.

Conclusion. The No-action Alternative would have a moderate, beneficial, and long-term effect on the National Area's contribution to local tourism and recreation. In addition, it would continue to provide important economic benefits to the regional economy in the form of tourism expenditures. Therefore, it would have a moderate, beneficial, and long-term impact on the regional tourism economy.

Concessions

Analysis. The No-action Alternative would not result in important changes in management policies, plans, or actions. Concession contractors and other business permit holders would continue to experience increases, albeit small and seasonal, in business activity associated with normal tourism-related growth, resulting in a minor beneficial effect.

Cumulative Impacts. Recreation-related development in the vicinity of the National Area, such as the Daniel Boone National Forest could generate additional business for concessioners. This, in conjunction with the normal tourism-related growth at the National Area would have a minor beneficial cumulative impact.

Conclusion. The socioeconomic impacts on concessioners and other commercial businesses operating within and adjacent to the National Area would be positive but minor under the No-action Alternative. In light of the positive effect on overall recreational activity of other developments in the vicinity of the National Area, the cumulative effects would be minor and beneficial.

OPERATIONAL EFFICIENCY

Analysis. Under the No-action Alternative, the National Area would continue to be managed according to current policies. Only limited new buildings (such as a fire cache and an artifact/collections storage facility) or utility upgrades would be built. Continued use of existing administrative facilities would continue to have a minor to moderate adverse impact on operational efficiency. In particular, continued use of the Area's substandard collections-storage facility would limit the public's access to significant artifacts and would cause continued degradation of important resources. In addition, managing the National Area with existing levels of NPS staff could result in adverse impacts. Although current staff levels have achieved a certain level of efficiency, limitations exist that inhibit the National Area's ability to provide desired levels of resource protection and preservation, maintenance of existing facilities, and visitor services. Under the No-action Alternative, maintenance needs for deteriorating and improperly designed roads and trails would increase. Use of most roads and trails would continue to be unmanaged, making protection of resources difficult for National Area staff. Impacts resulting from intentional and unintentional damage to archeological resources would be likely to increase. Taken together, these conditions would have a minor to moderate, adverse impact on operational efficiency.

Cumulative Impacts. Growth and development in the vicinity of the National Area and in the region as a whole would have a minor to moderate, long-term and adverse impact on operational efficiency. The most important impact would be increased visitation to the National Area and adjacent public lands, which would further stretch the ability of NPS staff to protect, preserve, and interpret National Area resources, and place greater demands on existing facilities.

Conclusion. The No-action Alternative would result in no substantial change in operations of the National Area. Impacts to operational efficiency resulting from the retention of existing administrative buildings, work space, and visitor contact facilities would be negligible. However, at current staffing levels, operational efficiency in protecting visitors and park resources would be increasingly diminished. Thus, the No-action Alternative would result in impacts that are minor to moderate, long-term and adverse.

CONSISTENCY WITH THE PLANS OF OTHERS

Under the No-action Alternative, National Area management would continue as before and there would be no new impacts on the plans of surrounding communities or other Area neighbors. Community goals in the surrounding counties were identified during the preparation of comprehensive plans prepared in the 1980s. Generally, they include providing for beneficial interrelationships between work, living, and recreational areas, protecting natural resources for the use and enjoyment of present and future citizens and visitors, developing the area without spoiling the environment, and providing citizens with a high-quality environment for living, work, and leisure time activities. While some of those who have provided comments earlier disagree with various specific National Area management actions, the overall preservation and use of the National Area generally contribute to these goals, and this would not change under the No-action Alternative. Cooperation with adjacent publicly owned areas will continue to contribute to satisfactory relationships. Lack of resources and staff will continue to prevent greater cooperation with the town of Rugby, despite a desire for greater cooperation by both groups.

State recreation planning indicates the National Area contributes importantly to the supply of public recreation opportunities and to other, related goals. Among these are resource preservation and interpretation, provision of appropriate facilities, and long-term benefits to the economy. All of these are indicated by the National Area's purposes as laid out by its legislation, and all would continue under the No-action Alternative.

National Area management would continue to coordinate with businesses providing visitor services and cooperate to achieve the objectives of all parties. In addition, various private land use and business ventures would continue to appear near and adjacent to the National Area whose objectives do not fully consider the Area's management requirements.

IMPACTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Private vehicles would continue to be the primary means of transportation to and through the National Area. There may be a gradual reduction in visitor, commuter employee, and concessioner gasoline consumption because of vehicles achieving better fuel economy as newer models replace older models over time, but this would be due to actions by entities other than NPS.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. This alternative would result in minor to major adverse impacts on natural and cultural resources in some areas of the National Area due to human use. Staff and funding limitations would constrain the ability of the National Park Service to fully mitigate these impacts. Minor to major adverse impacts would result from exposure of visitors and employees to natural hazards associated with the gorge terrain, the cliff edges, and whitewater streams. Additional hazards having minor to major impacts on visitors and employees include contaminated mine drainage and oil and gas operations.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

Under the No-action Alternative there could be permanent effects on National Area resources, particularly special status species and cultural resources. The result could be impairment of some National Area resources. There would be no irreversible commitments of resources.

RELATIONSHIP BETWEEN SHORT TERM USES OF THE ENVIRONMENT AND MAINTENEACE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Under the No-action Alternative, the vast majority of the National Area would remain protected in its natural state and would maintain its long-term productivity, i.e., the ability to achieve its mission. No additional levels

of action would be taken to manage visitor use. With increasing visitor use expected, there would be minor impacts on most natural resources in the National Area, with moderate impacts on soils and vegetation in some high use areas. Adverse impacts on the National Area's natural and cultural resources, if not mitigated, could reduce the ability of these resources to contribute to the Area's legislative mission in localized areas over time.

PREFERRED ALTERNATIVE (Alternative D)

MANAGEMENT ZONES: General Impacts

Unlike the No-action Alternative, the Preferred Alternative divides the National Area into different management zones, with each zone having specified management prescriptions for the resources located within the zone. The seven management zones are: Natural Environment Recreation Zone, Sensitive Resource Protection Zone, First Order Development and Visitor Use Zone, Second Order Development and Visitor Use Zone, Access Zone, First Order Transportation Zone, and Second Order Transportation Zone. The application of these management zones to the National Area would provide area-specific management direction including an indication of the kinds and levels of allowable actions. For example, the Sensitive Resource Protection Zone provides specific direction with respect to cliff edges; cliff faces; rock shelters; arches and chimneys; cultural spaces; wetlands; rare, threatened or endangered species; rivers and streams; and special scenery.

Upon implementation of the zones, management would become more specifically focused on achieving and maintaining the desired conditions for each zone. Management of the zones would necessarily entail monitoring resource conditions and responding to changes as appropriate. Such an increased level of management would be viewed favorably by some and unfavorably by others. Overall, the specific management prescriptions associated with the various zones would have impacts to National Area resources and values that are long-term and beneficial.

Management prescriptions have been developed to provide specifically for various resources and uses. In general, users would see an increase in user-type designations on roads and trails. The intended result is higher overall levels of visitor satisfaction and resource protection. The increase in designations indicates a greater control over use, which could result in certain use types being redirected, concentrated, or reduced in certain areas. These changes would likely be viewed as undesirable by the affected previous users whose use patterns were changed. Such changes could result in reactions ranging from minor to major inconvenience. Other users would perceive long-term, beneficial impacts as a result of reduced conflict among user groups and improved resource conditions.

NATURAL RESOURCES

Geology, Physiography, and Soils

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the Preferred Alternative, visitor facilities would continue to consist primarily of a basic system of roads, trails, and access points. However, in contrast to the No-action Alternative, the Preferred Alternative includes a number of measures specifically designed to protect and conserve the National Area's geologic, physiographic, and soil resources. These measures include:

- improvement of various developed facility sites
- improvement of selected roads and trails
- designation of an official system of roads and trails, with specific types of use (e.g., hiking, horseback riding) assigned to particular roads and trails
- establishment of design and maintenance standards for individual roads/trails, varying by designated use
- identification and implementation of methods for trail/stream crossings that minimize soil erosion and sedimentation
- development of a protocol for assessing required maintenance for roads and trails
- development of a climbing management plan
- reclamation of disturbed lands in oil and gas extraction areas
- treatment of contaminated mine drainage and site restoration

Together, these measures would have a moderate to major, long-term, beneficial impact on soils and geologic resources.

Under the Preferred Alternative, additional funding and staffing would be available to address threats to soil resources. These threats stem in large part from poorly designed and sited trails, many of which are located on old, incised logging and mining roads. Moderate to major adverse impacts to soils in the form of extensive soil erosion and exposed bedrock have occurred in the past on heavily used horse trails, especially in steep areas between the plateau and gorge bottom. Under this alternative, impacts would be diminished by improved maintenance, and, where appropriate, major rehabilitation. To further reduce impacts, new trails would be constructed in accordance with new trail standards. These standards establish maximum trail widths, set target grades, and include preferred construction designs.

Moderate adverse impacts have also occurred at creek crossings and horse fords along the river, where large amounts of soil have been disturbed and released into the water column as sediment. Under the Preferred Alternative, studies would seek to identify methods for minimizing the impacts on soil resources at stream crossings.

Direct impacts from installation of visitor facilities would include surface compaction of soils. Site preparation could result in either removal or addition of earth, destroying soil structure. There would be an increase in sheet erosion and reduced water infiltration. These impacts would occur from facility development or rehabilitation and would be considered long term. Following development, use of the facilities would likely expand the area of soil compaction and root exposure generally around the facility and along nearby trails. These indirect impacts would also be considered long term, although unacceptable levels of impacts would be identified and corrected through visitor education, site hardening, and/or use management. Rehabilitation of impacted areas would occur where possible. Impacts associated with the building and rehabilitation of facilities would be negligible to moderate, long-term and adverse for soil resources.

NPS policy prohibits the surface mining of soil, gravel, or rock materials for any park operations purposes, including the building of roads or facilities. Most modifications to access roads, trails, and developed sites would be limited to existing disturbed areas and would not likely involve blasting or other modification of bedrock geology. The potential impacts to geologic resources from road or facility development or NPS operations would thus be negligible. In contrast, visitor activities have the potential to adversely impact sensitive geologic resources such as rock shelters, arches and chimneys. Under the Preferred Alternative, these features would be placed in the Sensitive Resource Protection Zone and managed in accordance with prescriptions established for sensitive geologic resources. Adverse impacts may continue to occur, but would be less than under the No-action Alternative. The impacts on these geologic features would be negligible to minor, long-term and adverse.

The Preferred Alternative would likely result in increased visitation to the National Area as a result of improved facilities and increased opportunities for certain types of outdoor experiences. In particular, visitor activities such as camping, hiking, biking, climbing, and horseback riding would likely increase over levels anticipated by the No-action Alternative and would continue to have localized effects on soils. However, the use designations

for particular roads and trails would decrease erosion by limiting activities to those uses the particular road/trail was designed to handle. For example, under this alternative, ATVs would only be allowed on multiple-use trails during big-game hunting season. In addition, an experimental trail for ATVs only could be sited in one of two ATV planning areas. (Additional routes could be designated later if monitoring were to indicate that such expanded use was consistent with protection of Area resources and values.)

Notwithstanding the use designations, visitors would continue to overuse some facilities such as certain trails and also use inappropriately, and in some cases illegally, certain sensitive, readily accessible resources such as rock shelters and arches. In previously undisturbed areas, human trampling would result in vegetation loss followed by soil compaction and erosion. Social trails on sloping hillsides would act as channels for surface water runoff, resulting in soil erosion. These negative impacts would be mitigated under the Preferred Alternative by focusing additional resources on monitoring and rehabilitation of disturbed areas, and, in some cases, relocation. The increased visitor use associated with this alternative would result in negligible to minor, long-term and adverse impacts on soils and geologic resources throughout much of the National Area.

In some high-use areas, such as Bandy Creek, there would be minor to moderate adverse impacts, as repeated trampling resulted in high plant mortality and increased erosion potential. Under the Preferred Alternative, NPS staff would devote additional resources to problem sites to prevent and reduce impacts and to restore damaged areas. However, these efforts would not prevent or reduce all impacts under the increased visitation levels anticipated under this alternative. Thus, minor to moderate long-term adverse impacts would likely occur in high-use areas.

In other, more remote locations in the National Area, there would be negligible to minor adverse impacts on soils under the Preferred Alternative, as relatively few plants, in localized areas, would be affected by trampling and other disturbance. The potential for soil erosion in these areas would not increase appreciably, even with increased visitation.

Increased parking by visitors in non-designated vegetated areas would cause loss of vegetation, which would contribute to soil erosion. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Actions outside the park have resulted in, and would be likely to continue to result in, minor to major long-term adverse effects on soils in the vicinity of the National Area, such as the New River area and the Bear Creek watershed. In particular, logging, mining, oil and gas extraction, and commercial and housing developments on lands outside the National Area boundary have had (and would continue to have) erosive effects on soils along the boundary.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection to undisturbed soils. However, these efforts would not diminish the effects of development in the near term on localized areas.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the potential for soil erosion. Because these actions would affect small, localized areas, their long-term beneficial effects would be minor.

Past projects undertaken within the National Area that would affect soils include improperly located and/or unmaintained roads and trails that continue to erode. Rehabilitation and maintenance of these facilities under this alternative would result in reduction in erosion overall, although the actual work would cause minor short-term adverse impacts on soils. Impacts would be limited due to their limited scope, the use of best management practices to control soil loss during build-out, and prompt revegetation after project completion. Over the long term, however, maintenance generally would result in minor to moderate beneficial impacts.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative impacts of these actions would likely be minor to major, long-term and adverse with respect to soils in the region, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.

The Preferred Alternative would make a minor contribution to these cumulative impacts. This minimal contribution results from the relatively small areas of disturbed soils in the National Area, as well as NPS' commitment to ensuring the protection of soils and geologic resources as an integral component of the National Area.

Conclusion. Increased visitor activities under the Preferred Alternative would result in localized, minor, long-term, and adverse impacts on soils and geologic resources, with moderate impacts in some high use areas. Impacts would include increased soil compaction and erosion. These impacts would be minimized or prevented by the management prescriptions contained in the Preferred Alternative. In the region as a whole, there would likely be minor to major long-term cumulative adverse impacts on soils and geologic resources, primarily due to logging, mining, oil and gas extraction, and land development. This alternative's contribution to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any geologic, physiographic, or soil resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the geologic, physiographic, and soil resources of the National Area.

Water Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the Preferred Alternative, National Area personnel would continue or commence the following initiatives to protect and improve water quality:

- develop a watershed protection strategy through data collection, management improvements, and increased cooperation with others
- reclaim resources contaminated by mine drainage
- coordinate with surrounding communities concerning water needs
- improve the minerals management program by completing plans of operation for oil and gas sites, plugging abandoned wells, and reclaiming disturbed lands
- where necessary, rehabilitate roads, trails and developed sites so as to prevent runoff of sediment and contaminants into adjacent receiving streams

Together, these measures would have a moderate to major, long-term, beneficial impact on water quality. Nevertheless, minor to moderate, long-term and adverse impacts on water quality would continue, given that land uses in the watershed outside the National Area boundary would continue to contribute sediment, pollutants, and nutrients to tributary streams.

The treatment and reclamation of contaminated mine drainage sites would occur at various locations in the gorge. This work would involve multiple sites, would require heavy machinery, would result in permanent landscape change, and would need to be maintained in perpetuity. Work on this scale appears necessary to minimize or eliminate this long-standing water quality issue. The impacts on water quality are expected to be major, long-term and beneficial.

A number of roads and trails in the National Area do not presently meet accepted standards for facility design and location, especially those located in steep areas between the plateau and gorge bottom. These roads and trails are susceptible to greater rates of erosion than is typical for properly designed facilities of this type. The result is a reduction in water quality in Area streams due to excessive sedimentation. Under the Preferred Alternative, substandard roads and trails would be rehabilitated over time, resulting in a net decrease in

sedimentation of the Big South Fork and its tributaries. New trails would be constructed in accordance with accepted trails standards, as set forth in the plan.

As a result of the improved access and rehabilitated roads and trails contemplated by the Preferred Alternative, visitor uses such as camping, hiking, climbing, biking, and horseback riding would likely increase more than they otherwise would under the No-action Alternative. These levels of visitor use would continue to have localized, indirect effects on water quality due to increased soil compaction, vegetation trampling, and consequent loss of vegetation in some areas. These effects would lead to greater erosion and the addition of sediment to adjacent waters. The nature and extent of soil compaction and vegetation damage, and therefore, of related impacts on water quality, would depend on the types of local soils, vegetation and topography, as well as the areal extent, duration, and intensity of use. However, sedimentation effects generally would be slight in comparison to the sedimentation occurring as a result of runoff from disturbed areas outside the National Area. Therefore, under this alternative sedimentation-related impacts on water resources from visitor use would be negligible to minor.
A number of development sites are adjacent to the Big South Fork River or other streams because they provide visitor access to and use of the waters within the National Area. Roads and trails that cross streams would contribute to stream turbidity during development periods and during certain maintenance activities. Standard mitigating measures such as silt screens, check dams, retention ponds, and other barriers would be used to minimize erosion and prevent short-term deterioration of water quality during any ground disturbance. All disturbed areas would be revegetated to prevent long-term impacts from any runoff. Monitoring of water quality would be an important management activity. Development-related impacts on water quality are thus anticipated to be negligible to minor, short-term and adverse.

The anticipated increase in use of unpaved roads by visitors under the Preferred Alternative could make these facilities more susceptible to surface erosion and runoff. Vehicle use along roads and in parking lots would continue to deposit petroleum products that could be washed into adjacent waters. Impacts would generally be minor due to mitigation techniques such as placement of sediment traps and and/or biofiltration (vegetation filtration) along roadsides.

At present, oil and gas development regulation is substandard. Within the National Area, many wells are not in compliance with state and federal standards. Impacts to water quality appear to be minor for now, but increases in drilling activity (as is presently happening at nearby Obed Wild and Scenic River) could result in moderate to major adverse impacts if these operations are not better managed. The potential for adverse impacts is magnified by the fact that many wells are located near the edge of the gorge. Poor compliance could result in impacts to water quality that are long-term, moderate to major, and adverse. Under the Preferred Alternative, National Area staff would implement a minerals management plan. The plan would include provisions for keeping current with oil and gas operational planning pursuant to 36 CFR 9B, reviewing site plans and permits for oil and gas sites, coordinating with various agencies, and investigating spills and other detrimental disturbances. In principle, impacts to oil and gas producers should be negligible since the plan would merely embody the requirements of existing law. However, those producers not currently in compliance could incur some expense in upgrading their operations. Impacts to water quality from improved enforcement would be moderate to major, long-term and beneficial.

Improper disposal of untreated human waste in areas without toilet facilities currently causes minor water quality problems. Under the Preferred Alternative, this problem would increase proportionately with increased human use of the area.

Cumulative Impacts. Actions outside the National Area would continue to result in moderate to major adverse effects on water quality due to increased loading of sediment, nutrients, chemical pollutants, and pathogens.

- Continued acid mine drainage would continue to have minor to moderate long-term adverse effects on water quality.

- Logging and timber harvesting would continue to have minor to moderate short-term adverse effects on water quality. These would result from sediment entering rivers and streams that originate outside the National Area.
- Runoff from existing and new developments in the area, including oil and gas extraction sites, would have minor to moderate long-term adverse effects on water quality in rivers and streams originating outside the National Area.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for water quality and water resources. However, these efforts would not diminish the effects of development in the near term. Increased emphasis on enforcing existing water pollution laws could provide a substantial improvement to future water quality by, among other things, controlling siltation.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the entry of sediments into local waters. This would affect small, localized areas and would have, overall, a moderate beneficial effect.

Past projects undertaken within the National Area that would affect water quality include improperly located and/or unmaintained roads and trails that continue to erode. Rehabilitation and maintenance of these facilities under this alternative would result in reduction in erosion overall, although the actual work would cause minor short-term adverse impacts on water quality resulting from small increases in sediment and other pollutants. Impacts would be limited due to their limited scope, the use of best management practices to control soil loss during development, and prompt revegetation after project completion. In addition, development of new erosion control techniques and rigorous implementation would help ensure that the short-term impacts were minor. Over the long term, maintenance generally would result in minor to moderate beneficial impacts on water quality.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with the Preferred Alternative, the cumulative impacts would be moderate to major, long-term, and adverse in the region, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.
The Preferred Alternative would make a minor positive contribution to these cumulative impacts. This contribution results from the mandate of the National Park Service to protect resources within the National Area, as well as NPS' commitment to mitigate even minor water quality impacts through such measures as trail maintenance and rehabilitation.

Conclusion. Expected levels of visitor use under the Preferred Alternative would have a minor adverse impact on water quality by increasing levels of sediments, vehicle-related pollutants, and nutrients in rivers and streams. Most of these effects would be localized. Oil and gas development within the boundary of the National Area would increase the amount of disturbed area, possibly contributing increased sediment and polluted runoff to adjacent receiving streams. Because the Preferred Alternative prescribes enhanced management control for these operations, the impact of these operations on water quality would be localized, minor, short-term, and adverse. Overall, impacts on water quality would be minimized by the rehabilitation activities, use designations, and management zones and prescriptions contained in the Preferred Alternative. In some instances, water quality would be enhanced by these measures and the watershed protection strategies called for in this alternative. Although this alternative calls for the potential development of a number of new trails, appropriate development techniques and erosion control methods should result in minor impacts to water quality. The impacts of the Preferred Alternative on water quality would thus be minor to moderate, long-term, and beneficial as compared to the No-action Alternative. There would be major to moderate, long-term and adverse cumulative impacts in the region, primarily because of pollutant loads in runoff associated with logging and land development outside the National Area. The contribution of the Preferred Alternative to these adverse cumulative impacts would be negligible to minor.
Existing conditions are causing major adverse impacts to water quality in certain portions of the National Area. The Preferred Alternative would ameliorate some of these conditions. As a result, this alternative would not result in major, long-term, adverse impacts to any water resource or value, the conservation of which is (1)

necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in additional impairment to the water resources of the National Area.

Floodplains

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Impacts from the Preferred Alternative would be associated with the development, rehabilitation and enhanced maintenance of access roads, trails, parking areas, and stream crossings present in the floodplain, all of which have negligible impacts on floodplain resources and functions and hence are exempt from NPS policies on floodplain management (Director's Order 77-2; NPS Floodplain Procedures Manual 77-2).

Streamside facility development would occur to a small extent within the 100-year floodplain; however, NPS has determined that water access facilities are acceptable uses of floodplains. These types of facilities must be in proximity to the water to provide needed visitor access and use. Facility design would consider the likelihood of flooding and would include appropriate visitor warnings.
Cumulative Impacts. Projects outside the National Area affect floodplains of the Big South Fork and its tributaries. Ongoing commercial logging, mining and oil and gas extraction activities and associated road developments have had moderate impacts on floodplains and river processes in the area. Permanent roads developed for access to logging, mining, and oil and gas extraction areas cross floodplains and have created permanent alterations that will continue to have adverse impacts on floodplain values. The Preferred Alternative would not contribute to these cumulative impacts.

Conclusion. This alternative would result in negligible long-term adverse impacts on floodplain values throughout the National Area. Cumulative impacts would include moderate adverse long-term effects on floodplains because of actions outside the National Area. This alternative's contribution to these impacts would be negligible.

This alternative would not result in major, adverse impacts to any floodplain resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the floodplain resources of the National Area.

Wetlands

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Streamside facility development would occur to a small extent within the 100-year floodplain. These types of facilities must be in proximity to the water to provide needed visitor access and use. When a specific development is determined, whether at a streamside location or elsewhere, a wetland impact determination would be made and an appropriate site selected. If appropriate, detailed analysis of potential impacts on wetlands would be provided in the environmental documentation prepared for each development project.

Trail development and use can and does parallel and cross streams and associated wetlands. Development and maintenance in wetlands is difficult and expensive. In this alternative, new trails in wetlands would be

avoided where there are practical alternatives. If there are none, special building techniques would be used. Where existing trails in wetland areas need to be improved, or brought to standard, appropriate design would be used to minimize impacts.

Cumulative Impacts. Wetlands on both public and private lands in the vicinity of the National Area have been modified by logging, mining, and other development. Although the Clean Water Act requires that long-term impacts on wetlands be mitigated through wetland restoration or the creation of replacement wetlands, there has been a moderate, long-term, adverse cumulative impact on wetlands in the region. The Preferred Alternative would not contribute to this cumulative impact.

Conclusion. This alternative would cause negligible impacts on wetlands. Although there would be a moderate, long-term, adverse cumulative impact on wetlands in the region, the contribution of this alternative to this impact would be negligible.

This alternative would not result in major, adverse impacts to any wetland resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the wetland resources of the National Area.

Air Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the Preferred Alternative, visitor use is expected to increase at a somewhat greater rate than under the No-action Alternative. As a result, the number of vehicle miles traveled in the National Area and surrounding areas should be greater under this alternative than under the No-action Alternative. The resulting increase in vehicular emissions, coupled with a slight increase in the number of campfires, would likely result in increased emissions of particulates, carbon monoxide, and volatile organic compounds.
During any building activities, there would be a temporary increase in particulates (fugitive dust) and vehicle emissions where motorized equipment is used. Standard mitigation includes watering the disturbed areas. This would be a temporary condition and would not violate air quality standards.

Cumulative Impacts.
In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for air quality. However, these efforts would not diminish the effects of development in the near term.

Past projects undertaken within the park that would affect air resources include the use and maintenance of dirt roads. These actions would continue to have negligible to minor, short-term and adverse impacts on air quality resulting from small increases in dust and other pollutants. Designation of an official road system and rehabilitation of certain roads would help minimize impacts.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with this alternative, the cumulative effect of these actions would be a minor, long-term, and adverse impact on air quality, and a minor, long-term, and adverse impact on visibility in the region. These impacts would be primarily due to increased vehicular emissions and the effects of ongoing land development outside of the National Area. The Preferred Alternative would make a minor contribution to these cumulative impacts.

Conclusion. The Preferred Alternative would result in a negligible to minor impact on local air quality, due to slight increases in pollutants from vehicle exhaust and campfires. Cumulative impacts would include minor,

adverse impacts on regional air quality, as well as minor, adverse impacts on regional visibility. This alternative's contribution to these regional impacts would be negligible to minor.

This alternative would not result in major, adverse impacts to any air resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the air resources and values of the National Area.

Vegetation

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the Preferred Alternative, a number of steps would be taken to enhance protection of vegetation at the National Area. These steps include:

- develop an inventory and monitoring program to identify plant species in the National Area
- monitor the health of specific plant populations as well as the various types of plant communities, with special emphasis on rare, threatened, and endangered plant species
- develop a fields management program and plan to protect native biodiversity characteristic of this ecosystem
- rehabilitate roads, trails, and developed sites in order to diminish soil compaction and erosion and allow revegetation of disturbed areas
- limit the number of shared-use trails to insure that trails receive the type of usage they are designed to accommodate
- evaluate existing trails impacting rare, threatened or endangered plant species or unique habitats, and develop strategies to protect plant resources
- develop a climbing management plan
- complete oil and gas operations plans
- complete fire management plan

The impacts of these initiatives on vegetation in the National Area would be minor to moderate, long-term, and beneficial.

Unlike the other alternatives, the Preferred Alternative identifies specific boundaries for all development and visitor use zones. Specifying limits to future development would clarify the development-forest interface and enhance the protection of vegetation. Thus, while development of the facilities contemplated by this alternative would result in the destruction of some vegetation, the implementation of zone boundaries would minimize that destruction, resulting in minor, long-term and beneficial impacts to the National Area as a whole. Similarly, completion of fire management planning would permit actions that promote the health and viability of the forest ecosystem. Achievement of desired resource conditions would be accelerated, resulting in moderate to major, long-term and beneficial impacts.

Oil and gas development would continue on the plateau as provided in the National Area's enabling legislation. Associated activities include access road development, drilling, and interim petroleum storage. These activities can cause habitat fragmentation and possible introduction zones for non-native plant species. The required oil and gas operation plans, plus an overall strategy for managing impacts to vegetation as provided for in this alternative, would minimize resource damage and produce impacts that are minor to moderate, long-term and beneficial.

Visitor activities such as camping, hiking, climbing, biking, and horseback riding would increase more under this alternative than the No-action Alternative. In most areas, the impacts from these activities on vegetation

would continue to be localized and minor. In undisturbed areas, human trampling would bend or break aboveground plant parts. Trampled vegetation makes a site easily recognizable as an informal (social) trail or campsite, often contributing to an increase in human use. Repeated use of these newly disturbed areas, as well as previously disturbed areas, would result in vegetation loss. In some high-use areas, such as Twin Arches, there could be moderate adverse impacts as repeated trampling resulted in high plant mortality. Under the Preferred Alternative, NPS staff would focus additional resources on problem sites in order to prevent and reduce impacts and restore vegetation. The impacts associated with these efforts would be minor to moderate, long-term and beneficial.

The nature and extent of vegetation loss under the Preferred Alternative would depend upon the amount, timing, type, and location of use. In high-use areas, degradation could continue even after recreational use ceased because many plant species are unable to generate new growth following trampling, and vegetation loss occurs quickly. In other areas of the National Area, there would be negligible to minor adverse impacts to vegetation as relatively few plants, in localized areas, would be affected.

A number of special plant habitats occur in the National Area, including rock shelters, cliff areas, and gravel/cobble bars along the river. These habitats harbor rare and unusual plant communities that are particularly susceptible to human impacts. Existing uses are impacting a number of these communities, especially at Station Camp and Big Island. Various plant species are being affected, including plants listed as threatened or endangered by state and federal authorities. In extremely sensitive plant communities, relatively minor impacts could adversely affect rare, threatened, or endangered plants. Given the important local and regional role played by the National Area in conserving rare, threatened, and endangered plants, active management will be required to protect and enhance species abundance and composition. Under the Preferred Alternative, these impacts would be assessed and appropriate management strategies would be developed and implemented.

Increased visitor use might also help spread exotic (non-native) or noxious species – from seeds carried into the National Area on vehicles, horses, clothing, maintenance equipment, and other materials. Impacts would range from minor to moderate, depending on the type of plant and where it was introduced. Moderate impacts would occur if a local population of a native species or plant community were sufficiently affected to cause a change in its abundance or distribution. The inventory and monitoring program prescribed under this alternative would allow NPS personnel to identify problem areas and develop response strategies.

Under the Preferred Alternative, the use of OHVs in the National Area would continue, but usage would be limited to specific roads and trails designated for their use. By directing OHVs toward designated roads and trails and away from sensitive environments, damage to vegetation would be reduced, resulting in impacts that are minor to moderate, long-term and beneficial to the National Area as a whole. To the extent that users of OHVs were to leave the designated trails and create new routes or social trails, impacts to vegetation would be minor to major, long-term and adverse.

Dust and pollutants from motor vehicles in the area would increase slightly and continue to affect vegetation adjacent to roadways by interfering with plant respiration and causing plant decline. Increased parking by visitors in vegetated areas would cause loss of vegetation, which might lead to invasion by noxious weed species. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Actions outside the park have resulted in, and would be likely to continue to result in, minor to major long-term adverse effects on vegetation in the vicinity of the National Area. In particular, logging, mining, oil and gas extraction, and commercial and housing development on land adjacent to the National Area – and on private lands inside the authorized boundary – have had (and would continue to have) edge effects on Area vegetation. These effects include changes in species composition due to clearing, windthrow, changes in light regime, and infestations of non-native plants exotic pests.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for undisturbed vegetation. However, these efforts would not diminish the effects of development in the near term.

Watershed restoration projects on national forest lands, including the decommissioning and revegetation of some roads, would reduce the potential for invasion by exotic plants. Because these actions would affect small, localized areas, their long-term beneficial effects on the National Area would be minor.

Past projects undertaken within the National Area that would affect vegetation include the building and maintenance of roads, trails, and developed sites. Rehabilitation and maintenance of these facilities would continue to cause minor, short-term and adverse impacts on vegetation due to limited project scope, the use of best management practices to control vegetation disturbance during development, and prompt revegetation after project completion.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with the Preferred Alternative, the cumulative impacts of all of these actions on vegetation in the region would likely be minor to major, long-term and adverse, primarily because of the effects of acid mine drainage, oil and gas extraction, logging, and land development outside of the National Area.

The Preferred Alternative would make a negligible to minor contribution to these cumulative impacts. This minimal contribution results from the relatively small areas of disturbed vegetation in the National Area, as well as NPS' commitment to ensuring the protection of vegetation as an integral component of the National Area.

Conclusion. Increased visitor activities associated with this alternative mostly would result in localized, minor, long-term and adverse impacts on vegetation, with moderate to major impacts in some high use areas such as Bandy Creek, Twin Arches, and Blue Heron. Impacts would include trampled vegetation, loss of plants, and the spread of exotic species. These impacts would be minimized and in some cases offset by the rehabilitation activities, ecosystem restoration, and use of the management zones and prescriptions called for under this alternative. The impacts associated with these efforts would be minor to moderate, long-term and beneficial. In the regional context, there would continue to be minor to major long-term cumulative adverse impacts on vegetation, primarily due to mining, logging, fire management, oil and gas extraction, and land development. The contribution of this alternative to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any vegetation resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the vegetation resources of the National Area.

Terrestrial and Aquatic Animal Life

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under the Preferred Alternative, the National Area would take the following steps to protect and enhance terrestrial and aquatic animal resources:

- develop an inventory and monitoring program to identify life forms in the National Area and monitor the health of individual wildlife populations over time
- enhance biodiversity by introducing locally extirpated species, including black bear and various mussel species
- identify and implement method(s) of stream crossings that protect aquatic life, particularly mussels
- reduce habitat fragmentation by establishing a designated system of roads and trails for rehabilitation and periodic maintenance, allowing unofficial roads and trails to revegetate over time

- work with state wildlife agencies to achieve sustainable populations of fish and wildlife and reduce or eradicate exotic (non-native) species, such as feral pigs

The impacts of these initiatives on terrestrial and aquatic animal life in the National Area would be minor to moderate, long-term, and beneficial. In some instances, these initiatives could have impacts considered to be adverse as well, such as increased regulatory requirements attending the reintroduction of threatened or endangered species. As appropriate, the National Area will undertake separate compliance activities for individual initiatives.

Visitor uses such as camping, hiking, biking, and horseback riding would likely increase at a greater rate under the Preferred Alternative than the No-action Alternative. Impacts from these activities could include increased noise, vehicular traffic and habitat disturbance. The impacts of these activities under the Preferred Alternative would be adverse and would range from negligible to minor. These impacts would be offset in some cases by other aspects of the Preferred Alternative, such as efforts to identify and implement the environmentally selected method for stream crossings. Increased trail access may also promote more hunting and fishing in some areas, with corresponding impacts on wildlife and fish populations and behavior.

Most visitor use is concentrated in the center of the National Area. Increased human presence in these areas would result in some additional disturbance to wildlife. However, because these areas are already heavily used, it is doubtful that slight increases in human activity would noticeably increase impact to wildlife and wildlife habitat in these areas. Wildlife sensitive to human use already avoid these areas, and animals that do inhabit such locations would be accustomed to human use and would not be further impacted by additional human usage. To the extent that wildlife was disturbed, the disturbance would be temporary and would not affect local or regional populations. Therefore, the impacts, though adverse, would be negligible.

Increased use would result in a proportional increase in improper food storage by visitors. Food and garbage left out attracts wildlife, resulting in animals associating food with people and possibly causing human-wildlife conflicts. Some visitors would continue to feed wildlife, which would also condition wildlife to associate humans with food. Existing wildlife management practices, such as providing wildlife-resistant garbage cans and educating visitors, would continue to be implemented, resulting in negligible to minor beneficial impacts.

Slightly increased visitation levels may result in more hunting, fishing, and trapping pressure in the National Area. Each of these activities is governed by regulations issued by the states of Tennessee and Kentucky. Because the take-limits set by these regulations are based, in part, on anticipated use levels, only negligible to minor impacts on local and regional populations would likely occur.

Wildlife are occasionally injured or killed by motor vehicles on park roads, and this impact might increase under the proposed alternative as a result of additional motor vehicle travel. These adverse impacts would be minor because they would affect individuals, not entire populations.

Cumulative Impacts. Outside the National Area, the conversion of wildlife habitat to commercial and residential development would continue to result in adverse effects on wildlife. In addition, land development would fragment remaining habitat, making it less suitable to support species that are sensitive to the presence of humans. Increased habitat fragmentation and increasing numbers of people moving into established wildlife habitat would make wildlife management more difficult, with area landowners requiring more assistance from state and federal personnel to manage nuisance wildlife.

The effects of continued timber harvesting in areas with existing roads would be short-term, adverse, and minor to moderate. Animals would be displaced during harvesting operations, and land would have a diminished ability to support wildlife until vegetation was re-established. Thereafter, the creation of “edge” and early successional stages would improve the habitat for species that require this habitat, including such game species as deer, elk, grouse, and rabbits, while degrading the habitat of forest interior species such as certain types of neotropical migratory birds.

In the long term, local planning efforts to manage and control growth, if implemented, could have a minor beneficial impact by providing additional protection for wildlife habitat. However, these efforts would not diminish the effects of development in the near term. Development would continue to bring pets into direct contact with wildlife, with pets actively preying on various species in certain circumstances. There would also be an increase in non-native wildlife species as landowners continued to modify habitats. Development would also impact wildlife by limiting the extent to which public and private landowners could engage in prescribed burning to improve wildlife habitat.

Other actions taken by the National Park Service in the National Area, such as replacing bridges or rehabilitating roads and trails, could result in some loss of individuals or habitat. Effects resulting from these activities would be minor, short-term, and adverse. Habitat restoration after completion would prevent long-term effects.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with the Preferred Alternative, the cumulative impacts of all of these actions would likely be minor to major, long-term and adverse, primarily because of the effects of acid mine drainage, oil and gas development, logging, and land development outside of the National Area.

The Preferred Alternative would make a minor contribution to these cumulative impacts because the adverse impact within the National Area would be small and because of the large area of habitat loss or degradation that would occur outside of the National Area boundary.

Conclusion. Increased visitor activities associated with the Preferred Alternative would cause negligible to minor, long-term and adverse impacts on fish and wildlife. Impacts would be associated with increased visitor use displacing or disturbing wildlife, conditioning wildlife to associate humans with food, and injuring or killing wildlife in collisions with motor vehicles. Increased trail access may result in increased take of certain species by hunters, fishers, and trappers, and will likely result in additional poaching as well. Other aspects of the Preferred Alternative, including development of an inventory and monitoring plan, reintroducing locally-extirpated species, and reducing habitat fragmentation, would result in minor to moderate, long-term and beneficial impacts to terrestrial and aquatic animal life. Cumulative effects would include minor to major long-term adverse impacts, primarily due to habitat loss associated with logging and land development outside the boundary. The contribution of the Preferred Alternative to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any terrestrial or aquatic wildlife resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the terrestrial or aquatic wildlife resources of the National Area.

Special Status Species

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Under the Preferred Alternative, the National Area would commission inventory studies of special status species. These studies would augment existing information regarding the identity and locations of special status species, allowing Area staff to develop protection strategies for stabilizing and enhancing threatened populations. Of special concern are unique vegetation communities (e.g., certain communities found at rock shelters and gravel bars), as well as plant species listed as threatened or endangered by state and federal authorities. Also of particular concern are special status aquatic species, including the duskytail darter, other special status fish species, and five species of mussels on the federal endangered species list. Those elements of the Preferred Alternative addressed to improving water quality would have beneficial impacts on these species as well.

Until protective measures have been selected and implemented, the increased visitation anticipated under the Preferred Alternative would likely result in continued adverse impacts to special status species, particularly mussels and some plants. Increased use of horse crossings at Station Camp and Big Island would likely result in continued mortality of individual special status mussels and unique plants in these areas, thereby having an impact on federally listed species. In the short term, NPS would continue to cooperate with the U.S. Fish and Wildlife Service in addressing horse crossings to eliminate or further minimize this impact.

To address this problem, NPS staff would supplement inventory studies with studies specifically designed to identify the best ways to minimize or eliminate the adverse impacts of facility development/maintenance and visitor use on special status species. In particular, studies would be commissioned to identify the best method(s) for trail/stream crossings that protect threatened and endangered species. In some areas trails would need to be relocated. The Preferred Alternative also calls for extensive monitoring to insure that the protective measures selected by the National Area are, in fact, enhancing the long-term viability of special status species.

In addition to the comprehensive studies described above, site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the National Park Service would consult with the U.S. Fish and Wildlife Service and the states of Tennessee and Kentucky to determine mitigation measures to avoid or minimize adverse impacts on these species.

As a result of these initiatives, the actions contemplated in this alternative would not adversely affect special status species in the National Area. Overall, impacts of this alternative on special status species would be long-term and beneficial.

Cumulative Impacts. Mining, timber cutting, and development activities on privately owned lands inside and outside the National Area are of particular concern because they would continue to result in the degradation of water quality, thereby affecting mussel populations.

Land development, mining, and timber harvesting would continue to adversely affect all of the special status species outside the National Area through such mechanisms as habitat loss, habitat degradation (for example, altered water temperature and flow) and increased sedimentation. In particular, these activities could result in major losses of unique plant communities and special status plant species on private lands. The National Area would thus continue to play a critical role in protecting the biodiversity of the Cumberland Plateau, an area having many special status species found nowhere else in the world. To the extent the National Park Service were successful under this alternative in protecting and enhancing unique communities and special status species, the cumulative adverse impacts on special status species region-wide would be reduced.

Other actions taken by the National Park Service in the National Area, such as replacing bridges or rehabilitating roads, trails, and developed sites could result in some loss of individuals changes in habitat. Because the National Park Service would conduct pre-project surveys and implement mitigation, these actions would not be likely to have long-term adverse effects on any special-status species.

When the effects of actions by others and other actions in the National Area are combined with impacts associated with the Preferred Alternative, the cumulative impacts of all of these actions would adversely affect special-status species, primarily because of the impacts of acid mine drainage, logging, oil and gas extraction, and land development outside of the National Area. The Preferred Alternative would make a negligible to minor contribution to these adverse cumulative impacts.

Conclusion. Continued human use, along with expected increases in visitor use of the National Area, would cause disturbance to individuals of special-status plant and animal species. In the short-term, impacts to mussels from horse crossings would continue to be addressed through the use of route-flagging. In the long-term, practical protective measures would be studied, implemented, and monitored in order to avoid adverse impacts to mussels and other special status species.

For activities in other locations, specific survey, avoidance, and mitigation actions taken by the National Park Service would ensure that the Preferred Alternative would minimize impacts on any federally or state listed species. The specialized zoning approach of the Preferred Alternative would provide greater awareness of special status species. In particular, the management prescriptions associated with the Sensitive Resource Protection Zone would focus increased management and planning efforts on special status species.

The effects of actions by others outside the National Area would be likely to adversely affect special status species. The Preferred Alternative, with its emphasis on research and monitoring, as well as habitat restoration and species re-introduction where feasible, would not contribute to this cumulative effect.

This alternative would not adversely affect any special status species found within the National Area. Therefore, the environmental impacts associated with this alternative would not result in impairment to special status species.

CULTURAL RESOURCES

Archeological Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Archeological resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. Impacts would result from illegal relic hunting, building and maintenance activities, and visitor use.

Under the Preferred Alternative, measures would be implemented to minimize looting, the single greatest threat to archeological resources. These measures could include increased backcountry patrols (as more staff is added), re-routing/building trails away from cliff lines, directing visitation toward certain high-risk areas (more eyes mean fewer opportunities to loot), and more effective interpretation of these important, but dwindling, resources.

Direct impacts from development would be partially offset by cultural resource studies of areas to be developed. Ground disturbance would have the potential to adversely impact archeological resources, although many development sites in the National Area have been previously disturbed. Prior testing to permit consideration of alternate development sites would be undertaken. If avoidance of impacts on important resources were not possible, mitigation measures would be developed in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation. Mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations. If any unforeseen cultural resources were discovered, they would be documented and maintained according to NPS guidelines and standards. All actions that affect cultural resources would be in accordance with the *Secretary of the Interior's Standards for Archeology and Historic Preservation.*

In the near term, completion of the archeological survey would be a high priority. In addition, the National Area would expand its cultural resource management program and new initiatives would be undertaken to better define and manage cultural landscapes containing archeological resources. Inventorying and classifying these sites and their features and determining their treatment would be an ongoing effort. As a result of these efforts, more archeological sites and isolated finds would be documented and protected. In addition, NPS would endeavor to enhance the management of National Area museum collections. Upgrading the Area's substandard collections-storage facility would increase the public's access to significant artifacts and would safeguard important resources in a manner consistent with accepted protection standards. Taken together, these actions would result in minor to moderate, long-term and beneficial impacts on known and newly-discovered archeological resources.

Disturbance can also result from unrestricted visitor access to areas of known sensitivity for archeological resources. Visitor access impacts can include disturbances caused by overflow parking along roadside and trailhead areas, the creation and use of social trails, and occasionally the use and maintenance of existing trails. Some known prehistoric archeological sites are located near areas of high public use and visibility, such as rock shelters and arches. Some of these have sustained impacts from both natural and human caused erosion, a consequence of pedestrian and equestrian traffic on both designated and social trails. Under the Preferred Alternative, all areas having known or suspected concentrations of archeological resources would be included in the Sensitive Resource Protection Zone. Appropriate management prescriptions would be implemented for protecting these resources from disturbance or destruction.

Cumulative Impacts. Cumulative impacts on archeological resources are considered on a region-wide basis because prehistoric and historic activity in the Big South Fork region was not limited to the lands within the National Area boundary.

Actions outside the National Area include a variety of land disturbing activities, including mining, logging, oil and gas extraction, development projects and artifact collecting. Because of the large acreage involved, it is likely that numerous sites would continue to be impacted. If any of these actions require permits from state or federal agencies, recordation may be required. However, it is likely that many archeological resources will be destroyed without knowledge, causing an adverse effect.

When other actions external to the National Area and on private land inside the boundary are considered in conjunction with this alternative, the cumulative impacts on archeological resources would be major, long-term, and adverse, primarily because development outside of the National Area that would impact sites without recordation. However, the Preferred Alternative would not contribute to this adverse effect. In fact, both the management zoning included in this alternative and the mitigating measures adopted by the National Area require avoidance and protection of these resources. Therefore, the Preferred Alternative would be expected to preserve archeological resources for the region.

Conclusion. Under this alternative, a more systematic approach would be taken to the discovery, treatment, and protection of archeological resources than under the No-action Alternative. These efforts would complement established resource protection measures currently employed by National Area staff. The impacts to archeological resources from these measures would be minor to moderate, long-term and beneficial. More visitation, which could result in continuing erosion of some archeological sites, would have minor to moderate, long-term and adverse impacts to archeological resources that have not yet been identified or have not yet been the subject of treatment and protection measures. Known archeological resources as well as those that are newly discovered would be included in the Sensitive Resource Protection Zone and managed in accordance with prescriptions designed to maximize their long-term integrity. When actions external to the National Area are considered, there would be a major adverse cumulative effect on archeological resources in the region. The Preferred Alternative would make a negligible to minor contribution to this adverse effect.

This alternative would not result in major, adverse impacts to any archeological resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the archeological resources of the National Area.

Ethnographic Resource*s*

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. After the National Area was established, acquisition of land by the federal government resulted in the relocation of families and individuals away from their traditional homesites. Relatives of many of these people still live in the surrounding area. However, the National Area's enabling legislation resulted in the closure of most roads into the gorge. As a result, many local residents are prevented from having traditional motorized access to various sites of interest. Lack of use has resulted in the natural succession of many sites to forest.

The gorge will remain closed to most motorized access under all of the alternatives, in accordance with the dictates of the enabling legislation. Continued closure will result in moderate to major, long-term and adverse impacts to persons deprived of motorized access to traditional use sites. However, these impacts will not be attributable to the alternatives per se, but stem from legislative requirements.

Under the Preferred Alternative, certain sites will continue to be preserved and interpreted for visitors, including the Oscar Blevins, Lora Blevins and John Litton farmsteads. Landscape studies would be commissioned to document and determine the preservation and interpretation objectives of these historic farmsteads. Other traditional use sites are designated for continuing use, such as the Burnt Mill Bridge. In addition, oral histories will continue to be accumulated to document past residents' observations and experiences.

The Preferred Alternative would implement the identification and specific planning and management of areas included in the Sensitive Resource Protection Zone, as well as additional studies to document additional ethnographic resources.

Cumulative Impacts. Cumulative impacts on ethnographic resources are considered on a region-wide basis because historic activity in the Big South Fork region was not limited to the lands within the National Area boundary.

Actions outside the National Area include a variety of land disturbing activities, including mining, logging, oil and gas extraction, and development projects. Because of the large acreage involved, it is likely that many ethnographic resources have been and will continue to be destroyed, causing an adverse effect.

When other actions external to the National Area and on private land inside the boundary are considered in conjunction with this alternative, the cumulative impacts on ethnographic resources would be major, long-term, and adverse, primarily because of development outside of the National Area that would impact ethnographic resources. The National Area's enabling legislation would continue to result in a moderate, long-term and adverse impact on access to ethnographic resources, primarily because of the large area within the gorge that would remain closed to motorized vehicles. The Preferred Alternative would merely implement the closure requirement of the legislation, but would not otherwise contribute to this adverse effect. In fact, both the management zoning included in this alternative and the mitigating measures adopted by the National Area require avoidance and protection of ethnographic resources. Therefore, the Preferred Alternative would be expected to preserve a number of ethnographic resources for the region.

Conclusion. Establishment of the National Area required closure of most of the gorge to motorized access, resulting in moderate to major, long-term and adverse impacts to ethnographic resources. However, various sites and ethnographic resources within the National Area are being actively used or protected and interpreted for visitors, and these activities would continue under the Preferred Alternative. The impacts of these activities on ethnographic resources would be minor to moderate, long-term and beneficial. The Preferred Alternative also calls for targeted studies and management actions for ethnographic resources, and these actions would have minor to moderate, long-term and beneficial impacts.

Historic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Historical resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. The Preferred Alternative would not include any major new building projects or major changes that would affect historic resources. However, there would be a continued deterioration and loss of the historic fabric as a result of natural deterioration and ongoing human interaction. The Preferred Alternative calls for the performance of Historic Resource Studies of National Register-qualified structures, followed by stabilization/rehabilitation plans and guides to maintenance. In addition, the National Area would continue an ongoing effort to inventory and classify historic sites and their features and determine their treatment. Decisions would then be made based on specified criteria to preserve, rehabilitate, or restore particular historic resources. For these resources, existing protection measures would be enhanced to minimize adverse impacts associated with visitor use. For the rest, the toll of natural processes would be accepted after appropriate documentation. As a result of these efforts, more historic sites would be documented and protected than would be possible under the No-action Alternative. The relevant State Historic Preservation Officer would be involved in the decision-making process, as well as the Advisory Council on Historic Preservation, as appropriate.

Throughout the National Area, mitigation measures would be employed to minimize the loss of historic resources. In situations where potential impacts are identified, possible mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations.

Under this alternative, appropriate zone-specific management prescriptions would be implemented for protecting historic resources from disturbance or destruction, in addition to programmatic protection procedures. Increased visitation could result in physical wear and tear on structures, vandalism, and possible overuse of grounds. Efforts to minimize these effects would include careful determination of resources suitable for onsite interpretation to visitors, careful site selection for developments, visitor education, structured use of the site/resource by specific pathways or the use of guides. Adaptive uses, such as at Charit Creek lodge, would help preserve structures and other features. While historic fabric could be affected, prior Historic Structure Reports would document important elements. Monitoring of the resource conditions would be an important management function. Where appropriate, NPS would coordinate with the relevant State Historic Preservation Officer regarding response actions and mitigation measures. Treatment measures for historic resources would continue to conform to the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties*, 36 CFR section 68.

As a result of the actions described above, the Preferred Alternative would result in minor to moderate, long-term and beneficial impacts on historic resources.

Cumulative Impacts. Cumulative impacts on historic resources are considered on a region-wide basis because they extend beyond the National Area boundary.

Actions outside the National Area that could affect historic resources are the same as those identified for archeological resources. Specific impacts on historic resources outside the boundary are unknown. However, it is likely that numerous historic sites have been affected, and would continue to be adversely affected, because of the large acreages impacted by mining, logging, oil and gas extraction, and development projects. In instances where these actions are permitted by state or federal agencies, recordation may be required. However, it is likely that many historic resources have been and will continue to be destroyed without knowledge, resulting in an adverse effect. Although region-wide impacts have had a cumulative adverse effect on historic resources, they have not directly affected the structures inside the National Area eligible for listing on the National Register or the four component landscapes identified by the NPS Cultural Landscapes Program.

When other actions external to the National Area are considered in conjunction with this alternative, the cumulative impacts on historic resources would be major, long-term, and adverse, primarily because of the effects of logging, mining, oil and gas extraction, and land development outside the National Area. However, the contribution of the Preferred Alternative to this adverse effect would be negligible. In fact, both the management zoning included in this alternative and the mitigating measures adopted by the National Area

require avoidance and protection of these resources. Therefore, the Preferred Alternative would be expected to preserve historical resources for the region.

Conclusion. Adverse effects to historic resources would continue under the Preferred Alternative, but to a lesser extent than under the No-action Alternative. Efforts would be undertaken to inventory, classify, and monitor historic resources. Decisions would be made based on specified criteria to preserve, rehabilitate, or restore certain historic resources. The remaining historic resources would continue to be impacted by natural processes, but these impacts would be mitigated in ways appropriate to the site. The result would be minor to moderate, long-term and beneficial impacts on historic resources. More visitation, which could result in continuing deterioration of some historical sites, would have minor to moderate, long-term and adverse impacts to historical resources that have not yet been the subject of treatment and protection measures. Regionwide development activities would continue to have a cumulative adverse effect on historic resources. The Preferred Alternative would make a negligible contribution to the regionwide cumulative adverse effect.

This alternative would not result in major, adverse impacts to any historic resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the historic resources of the National Area.

VISITOR USE AND EXPERIENCE

Analysis. Under the Preferred Alternative, a variety of natural and cultural features would remain readily available for visitor use, including the river, gorge rim views, and certain historic sites. Many other features would likewise be available depending on visitor interests and abilities. However, compared to the No-action Alternative, access to some of these features would significantly improve under this alternative. For the first time, developed facility sites would be available in the Darrow Ridge and Tar Kiln Ridge areas. Bicycle riders would have access to additional trails. The John Muir Trail would be completed, and a number of smaller trails would be built providing links to trails on adjacent public and private lands. For horseback riders, connections between existing trails would be built, including a link between Bear Creek Horse Camp and Station Camp Horse Camp, as well as better connections with Daniel Boone National Forest.

Under this alternative, the route of the old O&W railroad would provide continued passenger vehicle access to the O&W Bridge from the east. The former railbed would be improved sufficiently to insure the safety of visitors, and the National Area and Scott County would coordinate their efforts to achieve desired use and resource conditions. The O&W route west of North White Oak Creek has been determined to be abandoned. Accordingly, this portion of the former railbed would be a trail designated for foot, horse, and bike use, consistent with the recommendations of previous studies. This proposal would generally continue existing visitor uses (except that OHV use would be prohibited) and would protect resources by upgrading the old roadbed to minimize erosion and protect vegetation. Overall, the impacts would be minor to moderate, long-term and beneficial. However, the impacts could be viewed as adverse by those who wish to continue OHV use on the railbed, or who would like to see motorized access to continue on all of the railbed.

As provided by the legislation establishing the National Area, access to game for hunting, trapping and fishing would continue under joint federal and state management. However, motor vehicle access to many sites in the gorge would remain largely curtailed due to legislative restrictions. In order to facilitate the removal of heavy game animals, the Preferred Alternative would authorize the use of ATVs on multiple use trails during big game (i.e., deer and wild boar) hunting season only. (Licensed and registered motor vehicles would be allowed on multiple use trails year-round, and hence could also be used for this purpose.)

Overall, OHV use would be more limited under this alternative than under the No-action Alternative. OHV use would be limited to designated routes on the plateau, in accordance with the National Area's enabling legislation. For the most part, use of ATVs would be restricted to hunters only, as discussed above. However,

an experimental general recreation trail for ATVs could be sited at the ATV Planning Area in the Darrow Ridge area. Additional recreational routes in the ATV Planning Area could be designated later if monitoring were to indicate that such expanded use was consistent with protection of Area resources and values.

Public education programs and exhibits would continue to be provided on- and off-site on a variety of resource-related subjects, as identified by a Comprehensive Interpretive Plan. Visitor contact/orientation stations would be located in several areas outside the National Area, allowing visitors to obtain information about the Area without having to drive to the central visitor center at Bandy Creek. This alternative would benefit public understanding over the long term as opportunities are continuously taken by National Area personnel to communicate elements of the alternative as well as required management. Overall visitor satisfaction would tend to increase since it would be clearer to them what to expect before arrival.

Visitors would continue to have access to concessioner services, including the Charit Creek Lodge, the Station Camp and Bear Creek horse camps, and the Bandy Creek Stables.

Uncrowded areas and solitude would remain widely available, but would diminish slightly over time as visitation levels increased. However, the establishment of a designated system of roads and trails would allow focused application of maintenance and rehabilitation efforts, thereby improving the quality of the visitor experience. Use-sharing of trails would be scaled back and in some cases eliminated, with the result that conflicts among user groups would diminish. The impacts from these efforts would be minor to moderate, long-term and beneficial for most visitors. However, use-restrictions on some roads and trails would constitute a long-term, minor to moderate, adverse impact for some visitors.

Cooperation with other entities in providing visitor orientation and information prior to arrival at the National Area would benefit visitor experiences by allowing greater planning and more efficient use of the National Area.

Overall, the impact of this alternative on visitor use and experience would be minor to moderate, long-term, and beneficial.

Cumulative Impacts. Development projects in the vicinity of the National Area could bring additional visitors to the general area. This could increase visitation to the National Area, especially during peak travel seasons. Cumulative impacts would be minor to moderate for visitors seeking an uncrowded, unconfined outdoor experience. On the other hand, the increased recreational opportunities provided under this alternative would allow for new experiences by visitors and dispersal of use away from more crowded areas.

When the cumulative impacts of actions by others are combined with impacts associated with this alternative, there would be minor to moderate, long-term and beneficial cumulative impacts on visitor use and experience in the National Area.

Conclusion. Under the Preferred Alternative, the general character of the National Area would not change, but the designation of an official roads and trails system, and the focused devotion of resources to rehabilitation and maintenance of those facilities, would result in minor to moderate beneficial impacts on visitor use and experience. For the most part, the existing levels of visitor facilities would be continued, but additional trailheads and connector trails would be developed, providing visitors with additional opportunities and experiences. Conflicts among user groups would decline through more specific use-designation, monitoring, and adaptive management. In contrast to the No-action Alternative, expanded educational and outreach programs would be undertaken, resulting in increased knowledge and enjoyment of resources in the National Area. Impacts from the Preferred Alternative would be long-term, minor to moderate, and beneficial, depending on location in the National Area and visitor preferences.

SOCIOECONOMIC ENVIRONMENT

Operation of the National Area

Analysis. Under the Preferred Alternative, the National Park Service would undertake significant efforts to provide new trailheads and trail connectors, improve the condition of existing roads, trails and developed sites, and significantly increase monitoring of natural and cultural resources. The actions contemplated by the Preferred Alternative would require new expenditures, with the possibility of new local contracts and the acquisition of labor and supplies from local communities. In addition, nearby communities would continue to experience direct benefits of expenditures by NPS for supplies and by individual NPS employee purchases. National Area employee salaries currently total approximately $2.9 million, which directly benefits the local economy. The increased National Area staff associated with this alternative would increase the total salary amount being spent in the local economy. In short, the impact of National Area operations on the local economy under the Preferred Alternative would be moderate to major, long-term and beneficial.

Cumulative Impacts. The lands around the National Area, particularly those areas near Oneida and Jamestown, Tennessee and Whitley City, Kentucky, would be affected by continued regional growth. Development activities outside the boundary could result in more concentrated residential and commercial development near the National Area, and also stimulate growth in tourism. The effects of growth in the regional context could have both beneficial impacts, such as increased income and employment, and adverse impacts, such as increased cost of housing, greater levels of pollution and congestion, and adverse impacts on wildlife habitat. Overall, development in the region would be likely to have moderate to major adverse and beneficial socioeconomic effects on the regional economy.

The Preferred Alternative would have a small incremental effect on increased employment or expenditures in the regional context, and therefore the impact, when combined with current impacts, would be moderate and beneficial. Therefore, in a regional context this alternative would make a moderate contribution to incremental cumulative impacts.

Conclusion. Any socioeconomic impacts on the region that could be expected from Area operations under this alternative would be moderate in effect. Although there would probably be moderate to major adverse and beneficial cumulative impacts on the economy from regional growth, the impact of National Area operations on the regional economy would be moderate under the Preferred Alternative. Impacts to the local economy would be more pronounced, with the Preferred Alternative having a moderate to major, beneficial impact on the local economy, assuming requested funding is made available to implement the Preferred Alternative.

Tourism and Recreation.

Analysis. The identification of long-term goals in this alternative will allow surrounding communities to better understand where the National Area is headed, allowing all parties to begin to work more in concert. Visitor patterns may change from current ones under this or any other alternative, but they would become more predictable since they would be based on a more clearly identified management direction. Businesses oriented to National Area visitors would be better able to align their expectations with National Area goals; and with limits placed on the kinds and levels of development within the National Area, the neighboring communities would better understand the role they could play in providing services. With realized expectations of businesses could come additional business ventures.

Under the Preferred Alternative, the National Area would be in a position to gain increasing visibility and become known to a wider range of potential visitors. Currently, visitors coming to the National Area are arriving with the expectations of certain conditions, facilities, and experiences. In contrast to the No-action Alternative, and to a greater extent than Alternatives A and B, the Preferred Alternative would better enable National Area personnel to meet these expectations by providing greater numbers and types of recreational opportunities, better maintained facilities, and enhanced protection for natural and cultural resources. Already, regional governments, businesses, and organizations are promoting the National Area as a destination for outdoor-related recreation. As the quality of the visitor experience is maintained or improved, these efforts would likely intensify, resulting in increased visitation and associated benefits to the economy.

Under the Preferred Alternative, gateway communities would continue to experience positive cyclical increases in business related to tourism. The local tourism industry would depend in part on, and benefit from, visitors

attracted to the National Area, and the National Area would be an increasingly important attraction in the area. The impact of the National Area on gateway communities or the regional area could change appreciably under this alternative, with the increases in visitation anticipated under the Preferred Alternative likely resulting in proportionately greater visitor expenditures in gateway communities than would take place under the No-action Alternative. Moreover, it is anticipated that the recreational opportunities afforded by the Preferred Alternative will spur construction of additional residential subdivisions near the National Area serving retirees, second-home owners, and others. Therefore, the Preferred Alternative would likely have a moderate to major, long-term, indirect and beneficial impact on the growth of the local tourism economy.

Cumulative Impacts. The Preferred Alternative would cause a moderate increase in regional recreation opportunities, and, over the long term, conceivably could change trends in regional population or economic growth. Therefore, in a regional context this alternative would make a moderate contribution to cumulative impacts on the regional tourism economy.

Conclusion. By enhancing the attractiveness of the National Area and vicinity to potential visitors and future residents, the Preferred Alternative would likely have a moderate to major, long-term, indirect and beneficial impact on the growth of the local tourism economy. The intensity of impacts will depend in large part on the level of funding available to implement the plan and the extent to which facilities called for in the Preferred Alternative attract additional residential development to the periphery of the National Area. This alternative would provide a moderate increase in regional recreation opportunities, with a moderate, beneficial impact on the regional tourism economy.

Concessions

Analysis. In contrast to the No-action Alternative and, to a lesser extent, Alternative A, the Preferred Alternative would improve opportunities for horseback riders. As a result, concession contractors and other business permit holders could experience greater increases in business activity under the Preferred Alternative than under either the No-action Alternative or Alternative A. However, increases would be slightly less than under Alternative B, which places more emphasis on recreation than any of the other alternatives. The impacts of the Preferred Alternative on concessioners and business permit holders would be minor to moderate, long-term and beneficial.

Cumulative Impacts. The Preferred Alternative could result in minor to moderate beneficial impacts to concessioners. These impacts, in conjunction with the normal tourism-related growth in the vicinity of the National Area, would have a minor to moderate, beneficial cumulative impact. The contribution of the Preferred Alternative to this beneficial impact would be minor to moderate.

Conclusion. The socioeconomic impacts on concessioners and other commercial businesses operating within and adjacent to the National Area would be positive but minor to moderate under the Preferred Alternative. In light of the positive effect on overall recreational activity of other developments in the vicinity of the National Area, the cumulative effects would be minor to moderate and beneficial.

OPERATIONAL EFFICIENCY

Analysis. Under the Preferred Alternative, the National Area would generally continue to use existing infrastructure, although some development of new facilities, such as trailheads and parking areas, would occur. In addition, development of a new collections-storage facility is proposed in order to provide public access to significant artifacts and allow protection of these resources in a manner consistent with accepted standards. Much of the National Area's existing office space is presently located in aging houses acquired with the Area's land base, and these structures would be replaced as they reach the end of their useful lives.

Continued use of existing administrative facilities would continue to have a negligible to minor adverse impact on operational efficiency. Occasional replacement of outdated facilities under this alternative would yield

minor, long-term and beneficial impacts to operations. In contrast to the No-action Alternative, the Preferred Alternative calls for slightly increased levels of NPS staff. Although current staff levels have achieved a certain level of efficiency, the additional staff in the Preferred Alternative would enhance the National Area's ability to provide desired levels of resource protection and preservation, maintenance of existing facilities, and visitor services. Under the Preferred Alternative, improperly designed and difficult-to-maintain roads and trails would be excluded from the National Area's official roads and trails system. Visitor use would be limited to those roads and trails included in the official roads and trails system. The National Area would undertake substantial rehabilitation and possible relocation of officially-recognized roads and trails, thereby making protection of resources easier for National Area staff. The management prescriptions associated with the various management zones would improve the ability of National Area staff to minimize damage to Area resources from visitor use and natural processes. Taken together, these conditions would have a minor to moderate, long-term and beneficial impact on operational efficiency.

Cumulative Impacts. Growth and development in the vicinity of the National Area and in the region as a whole would have a minor to moderate, long-term and adverse impact on operational efficiency. The most noticeable impact would be increased visitation to the National Area and adjacent public lands, which would further stretch the ability of NPS staff to protect, preserve, and interpret National Area resources, and place greater demands on existing facilities.

Conclusion. The Preferred Alternative would result in minor, beneficial changes in operations of the National Area. Although impacts to operational efficiency resulting from the retention of most of the existing administrative buildings, work space, and visitor contact facilities would, at least over the short term, be negligible, the proposed facility improvements, system designations, and increases in staffing levels would enhance operational efficiency, allowing National Area staff to provide improved protection for visitors and area resources. Thus, the Preferred Alternative would result in impacts that are minor to moderate, long-term and beneficial.

CONSISTENCY WITH THE PLANS OF OTHERS

The lack of clearer management direction for the National Area has likely hindered the ability of certain others to plan effectively. The more clearly stated goals of this alternative would help attain beneficial consistency among plans.

Under the Preferred Alternative, National Area management would change to enhance resource protection and improve recreational opportunities. There would be no new impacts on the plans of surrounding communities or other Area neighbors. Community goals in the surrounding counties generally include providing for beneficial interrelationships between work, living, and recreational areas, protecting natural resources for the use and enjoyment of present and future citizens and visitors, developing the area without spoiling the environment, and providing citizens with a high-quality environment for living, work, and leisure time activities. The overall preservation and use of the National Area generally contribute to these goals, and this would continue under the Preferred Alternative. Cooperation with adjacent publicly owned areas will continue to contribute to satisfactory relationships. Under the Preferred Alternative, greater emphasis will be placed on cooperation with the town of Rugby.

State recreation planning indicates the National Area contributes importantly to the supply of public recreation opportunities and to other, related goals. Significant among these are resource preservation and interpretation, provision of appropriate facilities, and long-term benefit to the economy. The Preferred Alternative, with its various management zones, would appear to provide the desired consistency with state recreation planning. Aside from the basic mandated purposes of the area, the gorge would receive the highest level of protection and the plateau would have potential for additional development, as described. In addition, sensitive natural and cultural resources would be placed in a Sensitive Resource Protection Zone, with corresponding management prescriptions. These arrangements would appear to be consistent with state and local goals as well.

National Area management would continue to coordinate with businesses that provide visitor services and cooperate to achieve the objectives of all parties. Nevertheless, various private land use and business ventures would continue to appear near and adjacent to the National Area whose objectives do not fully consider the Area's management requirements.

IMPACTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Private vehicles would continue to be the primary means of transportation to and through the National Area. There may be a gradual reduction in visitor, commuter employee, and concessioner gasoline consumption because of vehicles achieving better fuel economy as newer models replace older models over time, but this would be due to actions by entities other than NPS.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. Adverse impacts attributable to this plan and NPS management would arise out of facility development, maintenance and use. Standard practice includes mitigation of all identified impacts. Law, policy, and standard procedures guide these detailed considerations.

Development at or near the river and its tributaries and road and trail development that crosses streams would likely result in increases in turbidity through runoff as previously mentioned. While temporary and localized, these impacts would be considered unavoidable because of the recreation purposes of the National Area and the fact that the focus of many visits is river use in some form. Additional hazards having minor to major impacts on visitors and employees include contaminated mine drainage and oil and gas operations.

Some adverse impact would likely be unavoidable to resources, including sensitive resources, because of visitor use. Even with increased visitor education, staffing and funding, the complexity of natural processes and the large number of cultural resources in the National Area would constrain the ability of the National Park Service to fully avoid or mitigate adverse impacts. Impacts would be expected to be minor in terms of overall loss, although there is a potential for this to be major if the loss involves nonrenewable historic or archeological resources.

Monitoring use and resource conditions would assist in avoiding or minimizing adverse impacts and, when coupled with appropriate management strategies, would generally promote sustainable conditions within the National Area. It is a legal requirement for NPS to address carrying capacity issues in general management planning. Based on this requirement, it is NPS policy to establish goals in general management plans for resource conditions and the visitor experience for all areas within the units it administers through the use of management zoning. More detailed quantification of use levels appropriate to those management goals and discussion of possible strategies that could be employed to manage use levels if necessary are then documented in later implementation planning.

The VERP planning process (Visitor Experience and Resource Protection) has been developed by the NPS to follow general management planning to complete the carrying capacity analysis. The VERP process can be conducted separately or incorporated into other implementation planning efforts. The process consists of four key elements: (1) an areawide management zoning scheme that defines visitor experience and resource condition goals for all locations (accomplished in the general management plan), (2) selection of indicators that can be monitored to ensure that the goals are being met, (3) a systematic monitoring program, and (4) standards for each monitored indicator that is expected to warn when conditions merit management action. Ongoing research will refine indicators and standards that can be used to ensure provision of quality experiences while protecting National Area resources.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

All facility development and use is considered essentially a permanent commitment of resources, although removal of facilities and site restoration has occurred and could still occur. New facilities would be developed on sites that have negligible resource value, which would be specifically considered during detailed implementation planning.

RELATIONSHIP BETWEEN SHORT TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The resource prescriptions included in the management units, along with required management, are intended to ensure the achievement and maintenance of the purposes for which the National Area was established. All use and development would occur in the context of sustainable resource conditions that, in turn, permit sustained levels of visitor use and satisfaction.

Under this alternative, the vast majority of the National Area would remain protected in its natural state and would maintain its long-term productivity, i.e., ability to achieve its mission. A number of new actions would be taken to manage visitor use, including the designation of an official system of roads and trails and focused devotion of resources to rehabilitation of roads, trails, and developed sites. With increasing visitor use expected, there would be minor impacts on most natural resources in the National Area, with moderate impacts on soils and vegetation in some high use areas. Adverse impacts on the National Area's natural and cultural resources would be mitigated to enhance the ability of these resources to contribute to the National Area's legislative mission.

MANAGEMENT ZONES

This alternative is intended to be the most rustic of the four alternatives. Like the Preferred Alternative, Alternative A divides the National Area into different management zones, with each zone having specified management prescriptions for the resources located within the zone. However, this alternative provides only three zones, as opposed to the much more specific zones called for in the Preferred Alternative. The three zones in Alternative A are: primitive recreation unit, enhanced recreation unit and backwoods recreation unit.

The application of these management zones to the National Area would provide area-specific management direction including an indication of the kinds and levels of allowable actions. The Primitive Recreation Unit has the lowest tolerance for degradation and specifies only necessary and minimal interference with natural processes. This prescription for the gorge would provide the highest level of protection for this area, which contains most of the sensitive natural resources. This protection, along with the lowest level of development, i.e., dispersed trails, would do the most to benefit natural systems.

The Enhanced Recreation Unit would be applied only to areas already partly developed. Any future development would necessarily require some land disturbance, but would be located and designed to avoid or minimize impacts. Generally, fairly sizable land areas were included within the Enhanced Recreation Units to allow avoidance of sensitive resources and natural systems. Later planning and appropriate coordination would assure detailed consideration of these concerns.

In contrast to the Enhanced Recreation Units, the designated Backwoods Recreation Units would see less development. Most of these units would not change appreciably from current conditions. The kinds and levels of development that would occur would follow the unit prescription.

NATURAL RESOURCES

Geology, Physiography, and Soils

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Under Alternative A, visitor facilities would continue to consist primarily of a basic system of roads, trails, and access points. However, fewer facilities would be built or included under this alternative than under the Preferred Alternative or Alternative B.

Direct impacts from development would include surface compaction of soils. Site preparation could result in either removal or addition of earth, destroying soil structure. There would be an increase in sheet erosion and reduced water infiltration. These impacts would occur from the development activity and would be considered long term. Following development, use of the facilities would likely expand the area of soil compaction and root exposure generally around the facility and along nearby trails. These indirect impacts would also be considered long term, although unacceptable levels of impacts would be identified and corrected through visitor education, site hardening, and/or use management. Rehabilitation of impacted areas would occur where possible.
Impacts associated with development and rehabilitation of facilities would be negligible to moderate, long-term and adverse for soil resources.

Alternative A provides in general terms that the National Area will implement measures designed to protect and conserve the National Area’s geologic, physiographic, and soil resources. These measures are described with

less specificity in Alternative A than in the Preferred Alternative. These measures would have a moderate to major, long-term, beneficial impact on soils and geologic resources.

NPS policy prohibits the surface mining of soil or rock materials for any park operations purposes, including the building of roads or facilities. Most modifications to access roads, trails, and developed sites would be limited to existing disturbed areas and would not likely involve blasting or other modification of bedrock geology. The potential impacts to geologic resources from road or facility development or NPS operations would thus be negligible. In contrast, visitor activities have the potential to adversely impact sensitive geologic resources such as rock shelters, arches and chimneys. Under Alternative A, these features would be managed in accordance with the management prescriptions established for the alternative's three management zones. These resources would not be subject to the specialized zoning for sensitive resources found in the Preferred Alternative. The resulting adverse impacts would be greater than under the Preferred Alternative, but less than under the No-action Alternative. The overall impacts on these geologic features would be negligible to moderate, long-term and adverse.

Alternative A would likely result in some increase in visitation to the National Area, although not appreciably more than the increase anticipated to occur under the No-action Alternative. Increases would occur as a result of improved and rehabilitated facilities, as well as increased opportunities for certain types of outdoor experiences. In particular, visitor activities such as camping, hiking, climbing, and horseback riding would likely increase over levels anticipated by the No-action Alternative and would continue to have localized effects on soils. Impacts on soils would be minimized via an upgraded program for maintaining and rehabilitating roads, trails, and developed sites. However, this alternative would not include the use-designations for particular roads and trails found in the Preferred Alternative. As a result, certain roads and trails would continue to be difficult to maintain and would continue to erode as they experienced inappropriate use.

Visitors would continue to overuse some facilities such as certain trails and also use inappropriately, and in some cases illegally, certain sensitive, readily accessible resources such as rock shelters and arches. In previously undisturbed areas, human trampling would result in vegetation loss followed by soil compaction and erosion. Social trails on sloping hillsides would act as channels for surface water runoff, resulting in soil erosion. These negative impacts would be mitigated under Alternative A by focusing additional resources on monitoring and rehabilitation of disturbed areas. The increased visitor use associated with this alternative would result in negligible to minor, long-term and adverse impacts on soils and geologic resources throughout much of the National Area.

In some high-use areas, such as Bandy Creek, there would be minor to moderate adverse impacts, as repeated trampling resulted in high plant mortality and increased erosion potential. Under Alternative A, NPS staff would devote additional resources to problem sites to prevent and reduce impacts and to restore damaged areas. However, these efforts would not prevent or reduce all impacts under the increased visitation levels anticipated under this alternative. Thus, minor to moderate long-term adverse impacts would likely occur in high-use areas.

In other, more remote areas of the National Area, there would be negligible to minor adverse impacts on soils under Alternative A, as relatively few plants, in localized areas, would be affected by trampling and other disturbance. The potential for soil erosion in these areas would not increase appreciably, even with increased visitation.

Increased parking by visitors in vegetated areas would cause loss of vegetation, which would contribute to soil erosion. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities under Alternative A would result in localized, minor, long-term, and adverse impacts on soils and geologic resources, with moderate impacts in some high use areas. Impacts would include increased soil compaction and erosion. However, these impacts would be minimized by the management prescriptions contained in Alternative A's three management zones. In the region as a whole,

there would likely be minor to major long-term cumulative adverse impacts on soils and geologic resources, primarily due to logging, mining, oil and gas extraction, and land development. This alternative's contribution to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any geologic, physiographic, or soil resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the geologic, physiographic, and soil resources of the National Area.

Water Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Alternative A provides in general terms that National Area personnel would continue or commence various initiatives to protect and improve water quality. These measures are described with less specificity in Alternative A than in the Preferred Alternative. Overall, these measures would have a moderate to major, long-term, beneficial impact on water quality. Nevertheless, minor to moderate, long-term adverse impacts on water quality would continue under Alternative A, given that land uses in the watershed outside the National Area boundary could continue to result in slight increases in levels of sediment, pollutants, and nutrients in the water.

As a result of the improved access and rehabilitated roads and trails contemplated by Alternative A, visitor uses such as camping, hiking, climbing, and horseback riding would likely increase somewhat more than they otherwise would under the No-action Alternative. These levels of visitor use would continue to have localized, indirect effects on water quality due to increased soil compaction, vegetation trampling, and consequent loss of vegetation in some areas. These effects would lead to greater erosion and the addition of sediment to adjacent waters. The nature and extent of soil compaction and vegetation damage, and therefore, of related impacts on water quality, would depend on the types of local soils, vegetation and topography, as well as the areal extent, duration, and intensity of use. However, sedimentation effects generally would be slight in comparison to the sedimentation occurring as a result of runoff from disturbed areas outside the National Area. Therefore, sedimentation-related impacts on water resources would be negligible to minor.

A number of development sites are adjacent to the Big South Fork River or other streams because they provide visitor access to and use of the waters within the National Area. Roads and trails that cross streams would also contribute to stream turbidity during development periods and during certain maintenance activities and use periods. Standard mitigating measures such as silt screens, check dams, retention ponds, and other barriers would be used to minimize erosion and prevent noticeable short-term deterioration of water quality during any ground disturbance. All disturbed areas would be revegetated to prevent long-term impacts from any runoff. Monitoring of water quality would be an important management activity. Development-related impacts on water quality are thus anticipated to be negligible to minor, short-term and adverse.

The increased use of unpaved roads under Alternative A could make these facilities more susceptible to surface erosion and runoff. Vehicle use along roads and in parking lots would continue to deposit petroleum products that could be washed into adjacent waters. Impacts would generally be minor due to mitigation techniques such as placement of sediment traps and and/or biofiltration (vegetation filtration) along roadsides.

Improper disposal of untreated human waste in areas without toilet facilities currently causes minor water quality problems. Under Alternative A, this problem would increase proportionately with increased human use of the area.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Expected levels of visitor use under Alternative A would have a minor adverse impact on resources and water quality by slightly increasing levels of sediments, vehicle-related pollutants, and nutrients in rivers and streams. Most of these effects would be localized. Oil and gas development within the boundary of the National Area would increase the amount of disturbed area, possibly contributing increased sediment and polluted runoff to adjacent receiving streams. Because Alternative A prescribes, in general terms, enhanced management control for these operations, the impact of these operations on water quality would be localized, minor, short-term, and adverse. Overall, impacts on water quality would be minimized by the rehabilitation activities, management zones, and management prescriptions contained in Alternative A, although not to the same extent as would likely occur under the more comprehensive and detailed management prescriptions of the Preferred Alternative. In some instances, water quality would be enhanced by the measures called for in Alternative A. The impacts of Alternative A on water quality would thus be minor, long-term, and beneficial as compared to the No-action Alternative. There would be major to moderate, long-term and adverse cumulative impacts in the region, primarily because of pollutant loads in runoff associated with logging and land development outside the National Area. The contribution of Alternative A to these adverse cumulative impacts would be minor.

Existing conditions are causing major adverse impacts to water quality in certain portions of the National Area. Alternative A would ameliorate some of these conditions, but to a lesser extent than the Preferred Alternative. As a result, this alternative would not result in major, adverse impacts to any water resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in additional impairment to the water resources of the National Area.

Floodplains

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Alternative A would have negligible adverse impacts on floodplain values for the Big South Fork and its tributaries. These impacts would be associated with the development, rehabilitation and enhanced maintenance of access roads, trails, parking areas, and stream crossings present in the floodplain, all of which have negligible impacts on floodplain resources and functions and hence are exempt from NPS policies on floodplain management (Director’s Order 77-2; NPS Floodplain Procedures Manual 77-2).

Streamside facility development would occur to some extent within the 100-year floodplain; however, as noted above, NPS has determined that water access facilities are acceptable uses of floodplains. These types of facilities must be in proximity to the water to provide needed visitor access and use. Facility design would consider the likelihood of flooding and would include appropriate visitor warnings.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would result in negligible long-term adverse impacts on floodplain values throughout the National Area. Cumulative impacts would include moderate adverse long-term effects on floodplains because of actions outside the National Area. This alternative’s contribution to these impacts would be negligible.

This alternative would not result in major, adverse impacts to any floodplain resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the floodplain resources of the National Area.

Wetlands

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Streamside facility development would occur to some extent within the 100-year floodplain. These types of facilities must be in proximity to the water to provide needed visitor access and use. When specific development is determined and sites selected, whether at a streamside location or elsewhere, a wetland impact determination would be made. If appropriate, detailed analysis of potential impacts on wetlands would be provided in the environmental documentation prepared for each development project.

Existing practices that prevent indirect impacts on wetland areas would continue. Overall, impacts to wetland resources are expected to be negligible.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would cause negligible impacts on wetlands. Although there would be a moderate, long-term, adverse cumulative impact on wetlands in the region, the contribution of this alternative to this impact would be negligible.

This alternative would not result in major, adverse impacts to any wetland resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the wetland resources of the National Area.

Air Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under Alternative A, visitor use is expected to increase at a somewhat greater rate than under the No-action Alternative, but less than under the other alternatives. As a result, the number of vehicle miles traveled in the National Area and surrounding areas should be greater under this alternative than under the No-action Alternative. The resulting increase in vehicular emissions, coupled with a slight increase in the number of campfires, would likely result in increased emissions of particulates, carbon monoxide, and volatile organic compounds. Therefore, Alternative A would have a negligible to minor, long-term and adverse impact on air quality.

During development, there would be a temporary increase in particulates (fugitive dust) and vehicle emissions where motorized equipment is used. Standard mitigation includes watering the disturbed areas. This would be a temporary condition and would not violate air quality standards.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would result in a negligible to minor impact on local air quality, due to slight increases in pollutants from vehicle exhaust and campfires. Cumulative impacts would include minor, adverse impacts on regional air quality, as well as minor, adverse impacts on regional visibility. This alternative's contribution to these regional impacts would be negligible to minor.

This alternative would not result in major, adverse impacts to any air resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the air resources and values of the National Area.

Vegetation

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Alternative A provides in general terms that National Area personnel would continue or commence various initiatives to protect and restore native vegetation. These measures are described with less specificity in Alternative A than in the Preferred Alternative. The impacts of these initiatives on vegetation in the National Area would be minor to moderate, long-term, and beneficial.

Visitor uses such as camping, hiking, climbing, and horseback riding would increase less under this alternative than the other action alternatives. In most areas, the impacts from these activities on vegetation would continue to be localized and minor to moderate. In undisturbed areas, human trampling would bend or break aboveground plant parts. Trampled vegetation makes a site easily recognizable as an informal (social) trail or campsite, often causing human use to escalate. Repeated use of these newly disturbed areas, as well as previously disturbed areas, would result in vegetation loss. In some high-use areas, such as Twin Arches, there would be moderate adverse impacts, as repeated trampling resulted in high plant mortality. Under Alternative A, NPS staff would focus additional resources on problem sites in order to prevent and reduce impacts and restore vegetation. The impacts associated with these efforts would be minor to moderate, long-term and beneficial.

The nature and extent of vegetation loss under Alternative A would depend upon the amount, timing, type, and location of use. Fewer facilities would be built under this alternative than under the other action alternatives, thereby creating fewer areas where vegetation could be adversely affected by concentrated visitor usage.

In high-use areas, plant mortality would result in continued degradation even after recreational use ceased because many plant species are unable to generate new growth following trampling, and vegetation loss occurs quickly. In other areas of the National Area, there would be negligible to minor adverse impacts to vegetation as relatively few plants, in localized areas, would be affected.

A number of special plant habitats occur in the National Area, including rock shelters, cliff areas, and gravel/cobble bars along the river. These habitats harbor rare and unusual plant communities that are particularly susceptible to human impacts. Existing uses are impacting a number of these communities, especially at Station Camp and Big Island. Various plant species are being affected, including plants listed as threatened or endangered by state and federal authorities. In extremely sensitive plant communities, relatively minor impacts could adversely affect rare, threatened, or endangered plants. Given the important local and regional role played by the National Area in conserving rare, threatened, and endangered plants, active management will be required to protect and enhance species abundance and composition. Under this alternative, these impacts would be assessed and appropriate management strategies would be developed and implemented.

Increased visitor use might also help spread exotic (non-native) or noxious species from seeds carried into the National Area on vehicles, horses, clothing, maintenance equipment, and other materials. Impacts would range from minor to moderate, depending on the type of plant and where it was introduced. Moderate impacts would occur if a local population of a species or plant community were sufficiently affected to cause a change in its abundance or distribution. The inventory and monitoring program prescribed under this alternative would allow NPS personnel to identify problem areas and develop response strategies.

The use of OHVs in the National Area would continue under Alternative A, but usage would be limited to specific trails appropriate for their use. By directing OHVs toward appropriate areas and away from sensitive environments, damage to vegetation would be greatly reduced, resulting in impacts that are minor to moderate, long-term and beneficial to the National Area as a whole. Impacts to the areas where OHV use is allowed would be minor to moderate, long-term, and adverse. To the extent that OHV users were to leave the designated trails and create new routes or social trails, impacts to vegetation would be minor to major, long-term and adverse.

Dust and pollutants from motor vehicles in the area would increase slightly and continue to affect vegetation adjacent to roadways by interfering with plant respiration and causing plant decline. Increased parking by visitors in vegetated areas would cause loss of vegetation, which might lead to invasion by noxious weed species. Because these effects would be localized and occur in previously disturbed areas, the impacts would be negligible to minor.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities associated with this alternative mostly would result in localized, minor, long-term and adverse impacts on vegetation, with moderate to major impacts in some high use areas such as Bandy Creek, Twin Arches, and Blue Heron. Impacts would include trampled vegetation, loss of plants, and the spread of exotic species. These impacts would be minimized and in some cases offset by the rehabilitation activities, ecosystem restoration, and use of management zones and prescriptions called for under this alternative. The impacts associated with these efforts would be minor to moderate, long-term and beneficial. In the regional context, there would continue to be minor to major long-term cumulative adverse impacts on vegetation, primarily due to mining, logging, fire management, oil and gas extraction, and land development. The contribution of this alternative to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any vegetation resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the vegetation resources of the National Area.

Terrestrial and Aquatic Animal Life

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Alternative A provides in general terms that National Area personnel would continue or commence various initiatives to protect and restore native species. These measures are described with less specificity in Alternative A than in the Preferred Alternative. The impacts of these initiatives on terrestrial and aquatic animal life in the National Area would be minor to minor to moderate, long-term, and beneficial.

Visitor uses such as camping, hiking, and horseback riding would likely increase at a lesser rate under Alternative A than under the other action alternatives. Impacts from these activities could include increased noise, vehicular traffic and habitat disturbance. The impacts of these activities under Alternative A would be adverse and would range from negligible to moderate.

Most visitor use is concentrated in the center of the National Area. Increased human presence in these areas would result in some additional disturbance to wildlife. However, because these areas are already heavily used, it is doubtful that slight increases in human activity would noticeably increase impact to wildlife and wildlife habitat in these areas. Wildlife sensitive to human use already avoid these areas, and animals that do inhabit such locations would be accustomed to human use and would not be further impacted by additional

human usage. To the extent that wildlife was disturbed, it would be temporary and would not affect local or regional populations. Therefore, the impacts in these areas, though adverse, would be negligible.

Increased use would result in a proportional increase in improper food storage by visitors. Food and garbage left out attracts wildlife, resulting in animals associating food with people and possibly causing human-wildlife conflicts. Some visitors would continue to feed wildlife, which would also condition wildlife to associate humans with food. Existing wildlife management practices, such as providing wildlife-resistant garbage cans and educating visitors, would continue to be implemented, resulting in negligible to minor beneficial impacts.

Increased visitation levels may result in more hunting pressure in the National Area. All hunting activities are governed by regulations issued by the states of Tennessee and Kentucky. Because the take-limits set by these regulations are based, in part, on anticipated hunting pressure, only negligible to minor impacts on local and regional populations would occur.

Wildlife are occasionally injured or killed by motor vehicles on park roads, and this impact might increase under Alternative A as a result of additional motor vehicles traveling to new and existing facilities. These adverse impacts would be minor because they would affect individuals, not entire populations.
Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities associated with Alternative A would cause negligible to minor long-term adverse impacts on wildlife. Impacts would be associated with increased visitor use displacing or disturbing wildlife, conditioning wildlife to associate humans with food, and injuring or killing wildlife in collisions with motor vehicles. Impacts would be less under this alternative than the other action alternatives due to the relatively low levels of development contemplated by this alternative. Other aspects of this alternative, including additional research and resource management initiatives, would result in minor to moderate, long-term and beneficial impacts to terrestrial and aquatic animal life. Cumulative effects would include minor to major long-term adverse impacts, primarily due to habitat loss associated with logging and land development outside the boundary. The contribution of this alternative to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any terrestrial or aquatic wildlife resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the terrestrial or aquatic wildlife resources of the National Area.

Special Status Species

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.
Analysis. Under Alternative A, National Area staff would continue to develop protection strategies for stabilizing and enhancing threatened populations. Of special concern are unique vegetation communities (e.g., certain communities found at rock shelters and gravel bars), as well as plant species as listed threatened or endangered by state and federal authorities. Also of particular concern are special status aquatic species, including the duskytail darter, other special status fish species, and five species of mussels on the federal endangered species list. Those elements of this alternative addressed to improving water quality would have beneficial impacts on these species as well.

Until protective measures have been selected and implemented, the increased visitation anticipated under this alternative would likely result in continued adverse impacts to special status species, particularly mussels and some plants. Increased use of horse crossings at Station Camp and Big Island would likely result in continued mortality of individual special status mussels and unique plants in these areas, thereby having an impact on federally listed species.

To address this problem, NPS staff would supplement inventory studies with studies specifically designed to identify the best ways to minimize or eliminate the adverse impacts of facility development/maintenance and visitor use on special status species. In particular, studies would be commissioned to identify the best method(s) for trail/stream crossings that protect threatened and endangered species. In some areas, trails would need to be relocated. Monitoring would also occur to insure that the protective measures selected by the National Area are, in fact, enhancing the long-term viability of special status species.

In addition, site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the National Park Service would consult with the U.S. Fish and Wildlife Service and the states of Tennessee and Kentucky to determine mitigation measures to avoid or minimize adverse impacts on these species.

As a result of these initiatives, the actions contemplated in this alternative would not adversely affect special status species in the National Area.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Continued human use, along with expected increases in visitor use of the National Area, would cause disturbance to individuals of special-status species, as well as continuing mortality to individuals of special status mussels. In the short-term, impacts to mussels caused by horse crossings would continue to be minimized through the use of route-flagging. In the long-term, practical protective measures would be studied, implemented, and monitored in order to avoid adverse impacts to mussels and other special status species.

For activities in other locations, the survey, avoidance, and mitigation actions taken by the National Park Service would ensure that this alternative would minimize impacts on any federally or state listed species. The management zones prescribed in Alternative A would provide greater awareness of special status species than would the No-action Alternative, but less than the Preferred Alternative.

The effects of actions by others outside the National Area, when combined with the impacts of actions under Alternative A, would be likely to adversely affect special status species. With its provisions for additional research and corrective actions, Alternative A would not contribute to this cumulative effect.

This alternative would not adversely affect any special status species found within the National Area. Therefore, the environmental impacts associated with this alternative would not result in impairment to special status species.

CULTURAL RESOURCES

Archeological Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Under Alternative A, archeological resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. Illegal relic hunting would continue, but efforts would be made to curtail this activity as staffing permitted. Direct impacts from development would be partially offset by cultural resource studies of areas to be developed. Ground disturbance would have the potential to adversely impact archeological resources, although many development sites in the National Area have been previously disturbed.

Prior testing to permit consideration of alternate development sites would be undertaken. If avoidance of impacts on important resources would not be possible, mitigation measures would be developed in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation.

Mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations. If any unforeseen cultural resources were discovered, they would be documented and maintained according to NPS guidelines and standards. All actions that affect cultural resources would be in accordance with the *Secretary of the Interior's Standards for Archeology and Historic Preservation.*

In the near term, the National Area would expand its cultural resource management program and new initiatives would be undertaken to better define and manage cultural landscapes containing archeological resources. This approach would entail a more systematic survey of archeological resources than is contemplated under the No-action Alternative. Inventorying and classifying these sites and their features and determining their treatment would be an ongoing effort. As a result of these efforts, more archeological sites and isolated finds would be documented and protected. In addition, NPS staff would endeavor to enhance the management of National Area museum collections. Upgrading the Area's substandard collections-storage facility would increase the public's access to significant artifacts and would safeguard important resources in a manner consistent with accepted protection standards. Taken together, these actions would result in minor to moderate, long-term and beneficial impacts on known and newly-discovered archeological resources.

Disturbance can also result from unrestricted visitor access to areas of known sensitivity for archeological resources. Visitor access impacts can include disturbances caused by overflow parking along roadside and trailhead areas, the creation and use of social trails, and occasionally the use and maintenance of existing trails. Some known and suspected prehistoric archeological sites are located near areas of high public use and visibility, such as rock shelters and arches. Some of these have sustained impacts from both natural and human caused erosion, a consequence of pedestrian and equestrian traffic on both designated and social trails. Under this alternative, all areas having known archeological resources would be protected in accordance with NPS policies, and any new facilities would be sited and built in such a way as to avoid or minimize impacts on archeological resources. Protection of archeological resources would be somewhat less systematic under this alternative than under the Preferred Alternative because this alternative does not establish a Sensitive Resource Protection Zone with corresponding management prescriptions.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Under this alternative, a somewhat more systematic approach would be taken to the discovery, treatment, and protection of archeological resources than under the No-action Alternative. These efforts would complement established resource protection measures currently employed by National Area staff. The impacts to archeological resources from these measures would be minor to moderate, long-term and beneficial. More visitation, which could result in continuing erosion of some archeological sites, would have minor to moderate, long-term and adverse impacts to archeological resources that have not yet been identified or have not yet been the subject of treatment and protection measures. When actions external to the National Area are considered in conjunction with this alternative and other actions inside the National Area, there would be a major adverse cumulative effect on archeological resources. This alternative would make a minor contribution to this adverse effect.

This alternative would not result in major, adverse impacts to any archeological resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the archeological resources of the National Area.

Ethnographic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. After the National Area was established, acquisition of land by the federal government resulted in the relocation of families and individuals away from their traditional homesites. Relatives of many of these people still live in the surrounding area. However, the National Area's enabling legislation resulted in the closure of most roads into the gorge. As a result, many local residents are prevented from having traditional motorized access to various sites of interest. Lack of use has resulted in the natural succession of many sites to forest.

The gorge will remain closed to most motorized access under all of the alternatives, in accordance with the dictates of the enabling legislation. Continued closure will result in moderate to major, long-term and adverse impacts to persons deprived of motorized access to traditional use sites. However, these impacts will not be attributable to the alternatives per se, but stem from legislative requirements.

Under Alternative A, certain sites will continue to be preserved and interpreted for visitors, including the Oscar Blevins, Lora Blevins and John Litton farmsteads. Other traditional use sites are designated for continuing use, such as the Burnt Mill Bridge. In addition, oral histories will continue to be accumulated to document past residents' observations and experiences.

Cumulative Impacts. Same as the Preferred Alternative.
Conclusion. Establishment of the National Area required closure of most of the gorge to motorized access, resulting in moderate to major, long-term and adverse impacts to ethnographic resources. However, various sites and ethnographic resources within the National Area are being actively used or protected and interpreted for visitors, and these activities would continue under Alternative A. The impacts of these activities on ethnographic resources would be minor to moderate, long-term and beneficial.

Historic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under Alternative A, historical resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. This alternative would likely result in a somewhat greater increase in visitation than the No-action Alternative, but a smaller increase than the other action alternatives. These levels of visitation could result in fewer adverse impacts to historical resources than would occur under the Preferred Alternative or Alternative B.

Under this alternative, there would be a continued deterioration and loss of the historic fabric as a result of natural deterioration and ongoing human interaction. This alternative calls for an ongoing effort to inventory and classify historic sites and their features and determine their treatment. Decisions would then be made based on specified criteria to preserve, rehabilitate, or restore particular historic resources. For the rest, the toll of natural processes would be accepted after appropriate documentation. As a result of these efforts, more historical sites would be documented and protected than would be possible under the No-action Alternative. Throughout the National Area, mitigation measures would be employed to minimize the loss of historic resources. In situations where potential impacts are identified, possible mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations.

Under this alternative, appropriate management prescriptions would be implemented for protecting historic resources from disturbance or destruction. Increased visitation could result in physical wear and tear on structures, vandalism, and possible overuse of grounds. Efforts to minimize these effects would include careful determination of resources suitable for onsite interpretation to visitors, careful site selection for developments, visitor education, structured use of the site/resource by specific pathways or the use of guides. Adaptive uses, such as at Charit Creek lodge, would help preserve structures and other features. While historic fabric could be affected, prior Historic Structure Reports would document important elements. Monitoring of the resource conditions would be an important management function. Treatment measures for historic resources would

continue to conform to the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties*, 36 CFR section 68. However, as structures aged and more visitors to the National Area encountered historic structures, the potential would exist for increasing impacts.

As a result of the actions described above, this alternative would result in minor to moderate, long-term and beneficial impacts to historic resources.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Adverse effects to historic resources would continue under this alternative, but to a lesser extent than under the No-action Alternative. Efforts would be undertaken to inventory, classify, and monitor historic resources. Decisions would be made based on specified criteria to preserve, rehabilitate, or restore certain historic resources. The remaining historic resources would continue to be impacted by natural processes, but these impacts would be mitigated in ways appropriate to the site. The result would be minor to moderate, long-term and beneficial impacts on historic resources. More visitation, which could result in continuing deterioration of some historical sites, would have minor to moderate, long-term and adverse impacts to historical resources that have not yet been the subject of treatment and protection measures. Regionwide development activities would continue to have a cumulative adverse effect on historic resources. This alternative would make a minor contribution to the regionwide cumulative adverse effect.

This alternative would not result in major, adverse impacts to any historic resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the historic resources of the National Area.

VISITOR USE AND EXPERIENCE

Analysis. Under this alternative, a variety of natural and cultural features would remain readily available for visitor use, including the river, gorge rim views, and certain historic sites. Many other features would likewise be available depending on visitor interests and abilities. Compared to the No-action Alternative, access to some of these features would improve under this alternative, but no new major visitor facilities would be built. Of all the alternatives, Alternative A would place the least emphasis on visitor use. The enhanced recreation zone is smaller under this alternative than under Alternative B.

As provided by the legislation establishing the National Area, access to game for hunting, trapping, and fishing would continue under joint federal and state management. However, motor vehicle access to many sites in the gorge would remain largely curtailed due to legislative restrictions. To address this problem, access for hunters would continue to be available along designated access routes.

Public education programs and exhibits would continue to be provided on- and off-site on a variety of resource-related subjects. This alternative would benefit public understanding over the long term as opportunities are continuously taken by National Area personnel to communicate elements of the alternative as well as required management. Overall visitor satisfaction would tend to increase since it would be clearer to them what to expect before arrival.

Visitors would continue to have access to concessioner services, especially at the Charit Creek Lodge and the Station Camp and Bandy Creek horse camps.

Uncrowded areas and solitude would remain widely available, but would diminish slightly over time as visitation levels increased. Still, opportunities for this type of experience would be slightly greater under this alternative than under any of the of the other action alternatives. The establishment of a designated system of roads and trails would allow focused application of maintenance and rehabilitation efforts, thereby improving the quality of

the visitor experience. The impacts from these efforts would be minor to moderate, long-term and beneficial for most visitors.
Overall, the impact of this alternative on visitor use and experience would be minor to moderate, long-term, and beneficial.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Under this alternative, the general character of the National Area would not change, but the designation of an official roads and trails system, and the focused devotion of resources to rehabilitation and maintenance of those facilities, would result in minor to moderate beneficial impacts on visitor use and experience. This alternative provides for the development of fewer visitor facilities than do the other action alternatives. Visitors would have more opportunities for solitary experiences under this alternative than under the other action alternatives, but opportunities for more social forms of recreation and experience would be available as well. In contrast to the No-action Alternative, expanded educational and outreach programs would be undertaken, resulting in increased knowledge and enjoyment of resources in the National Area. Impacts from this alternative would be long-term, minor to moderate, and beneficial, depending on location in the National Area and visitor preferences.

SOCIOECONOMIC ENVIRONMENT

Operation of the National Area

Analysis. Under Alternative A, the National Park Service would undertake to provide new trailheads and trail connectors, improve the condition of existing roads, trails and developed sites, and increase monitoring of natural and cultural resources. The actions contemplated by this alternative would require new expenditures for additional labor and supplies. However, somewhat less development is called for under this alternative than the other action alternatives, and the expenditures for labor and supplies would be correspondingly smaller, resulting in fewer beneficial impacts to the local and regional economy. Nearby communities would continue to experience direct benefits of expenditures by NPS for supplies and by individual NPS employee purchases. National Area employee salaries currently total approximately $2.9 million, which directly benefits the local economy. The increased National Area staff associated with this alternative would increase the total salary amount being spent in the local economy. The impacts of all development and maintenance activities on the local economy would be moderate, long-term and beneficial.

Cumulative Impacts. Same as the Preferred Alternative

Conclusion. Any socioeconomic impacts on the region that could be expected under this alternative would be moderate in effect. Although there would probably be major adverse and beneficial cumulative impacts on the economy from regional growth, the impact of National Area operations on the regional economy would be moderate under this alternative. Impacts to the local economy would be somewhat more pronounced, with this alternative having a moderate to major, beneficial impact on the local economy.

Tourism and Recreation.

Analysis. The identification of long-term goals in this alternative will allow surrounding communities to better understand where the National Area is headed, allowing all parties to begin to work more in concert. Visitor patterns may change from current ones under this or any other alternative, but they would become more predictable since they would be based on a more clearly identified management direction. Businesses oriented to National Area visitors would be better able to align their expectations with National Area goals; and with limits placed on the kinds and levels of development within the National Area, the neighboring communities would better understand the role they could play in providing services. With realized expectations of businesses could come additional business ventures.

Under this alternative, the National Area would be in a position to gain increasing visibility and become known to a wider range of potential visitors. Currently, visitors coming to the National Area are arriving with the expectations of certain conditions, facilities, and experiences. In contrast to the No-action Alternative, but to a lesser extent than the other action alternatives, Alternative A would better enable National Area personnel to meet these expectations by providing greater numbers and types of recreational opportunities, better maintained facilities, and enhanced protection for natural and cultural resources. As the quality of the visitor experience is maintained or improved, visitation may also increase, along with associated benefits to the economy.

Under this alternative, gateway communities would continue to experience positive cyclical increases in business related to tourism. The local tourism industry would depend in part on, and benefit from, visitors attracted to the National Area, and the National Area would continue to be an important attraction in the area. The overall impact of the National Area on gateway communities or the regional area would not change appreciably under this alternative as compared to the No-action Alternative. Therefore, this alternative would likely have a moderate, long-term, indirect and beneficial impact on the growth of the local tourism economy.

Cumulative Impacts. Same as the No-action Alternative.

Conclusion. By enhancing the attractiveness of the National Area to potential visitors, this alternative would likely have a moderate, long-term, indirect and beneficial impact on the local tourism economy. This alternative would have a moderate effect on tourism to the region as a whole. Therefore, this alternative would have a moderate, beneficial impact on the regional tourism economy.

Concessions

Analysis. Alternative A contemplates less visitor-use development than any of the other action alternatives. As a result, even with some increase in visitation, concession contractors and other business permit holders could experience smaller increases in business activity under this alternative than the other action alternatives. The impacts of Alternative A on concessioners would be minor, long-term and beneficial.

Cumulative Impacts. Alternative A could result in minor beneficial impacts to concessioners. These impacts, in conjunction with the normal tourism-related growth in the vicinity of the National Area, would have a minor beneficial cumulative impact. The contribution of Alternative A to this beneficial impact would be minor.

Conclusion. The socioeconomic impacts on concessioners and other commercial businesses operating within and adjacent to the National Area would be minor, long-term and beneficial under Alternative A. In light of the positive effect on overall recreational activity of other developments in the vicinity of the National Area, the cumulative effects would be minor and beneficial.

OPERATIONAL EFFICIENCY

Analysis. Under Alternative A, the National Area would generally continue to use existing infrastructure, although some development of new recreational facilities, such as trails and parking areas, would occur. In addition, development of a new collections-storage facility is proposed in order to provide public access to significant artifacts and allow protection of these resources in a manner consistent with accepted standards. Much of the National Area's existing office space is presently located in aging houses acquired with the Area's land base, and these structures would be replaced as they reach the end of their useful lives.

In contrast to the No-action Alternative, this alternative calls for slightly increased levels of NPS staff. Although current staff levels have achieved a certain level of efficiency, the additional staff in this alternative would enhance the National Area's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. Under this alternative, maintenance needs would decrease as improperly designed and difficult-to-maintain roads and trails would be excluded from the National Area's official roads and trails system. Visitor use would be limited to those roads and trails included in the

official roads and trails system. Substantial rehabilitation would take place for officially-recognized roads and trails, thereby making protection of resources easier for National Area staff. Taken together, these impacts would have a minor to moderate, long-term and beneficial impact on operational efficiency.

Cumulative Impacts. Same as under the Preferred Alternative

Conclusion. Alternative A would result in minor, beneficial changes in operations of the National Area. Although impacts to operational efficiency resulting from retention of most of the existing administrative buildings, work space, and visitor contact facilities would be negligible, the proposed increases in staffing levels would enhance operational efficiency, allowing National Area staff to provide improved protection for visitors and area resources. Thus, this alternative would result in impacts that are minor to moderate, long-term and beneficial.

CONSISTENCY WITH THE PLANS OF OTHERS

Under Alternative A, National Area management would provide fewer recreational opportunities than are available under the other action alternatives. As with the Preferred Alternative and Alternative B, and in contrast to the No-action Alternative, the clearer management direction provided by Alternative A would provide greater consistency with the plans of others. As a result, there would be no adverse impacts on the plans of surrounding communities or other Area neighbors. Community goals in the surrounding counties generally include providing for beneficial interrelationships between work, living, and recreational areas, protecting natural resources for the use and enjoyment of present and future citizens and visitors, developing the area without spoiling the environment, and providing citizens with a high-quality environment for living, work, and leisure time activities. The overall preservation and use of the National Area generally contribute to these goals, and this would continue under Alternative A. Cooperation with adjacent publicly owned areas will continue to contribute to satisfactory relationships. Under Alternative A, greater emphasis will be placed on cooperation with the town of Rugby.

State recreation planning indicates the National Area contributes importantly to the supply of public recreation opportunities and to other, related goals. Significant among these are resource preservation and interpretation, provision of appropriate facilities, and long-term benefit to the economy. Alternative A, with its management unit applications, would appear to provide the desired consistency with state recreation planning. Aside from the basic mandated purposes of the area, the gorge would receive the highest level of protection and the plateau would have potential for additional development. This arrangement would appear to be consistent with state and local goals as well.
National Area management would continue to coordinate with businesses that provide visitor services and to cooperate to achieve the objectives of all parties. Nevertheless, various private land use and business ventures would continue to appear near and adjacent to the National Area whose objectives do not fully consider the Area's management requirements.

IMPACTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Private vehicles would continue to be the primary means of transportation to and through the National Area. There may be a gradual reduction in visitor, commuter employee, and concessioner gasoline consumption because of vehicles achieving better fuel economy as newer models replace older models over time.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. Adverse impacts attributable to this plan and NPS management would arise out of facility development, maintenance, and use. Important adverse impacts should not have to occur since the management units include sufficient area for sensitive facility siting. Standard practice also includes mitigation of all identified impacts. Law, policy, and standard procedures guide these detailed considerations.

Development at or near the river and its tributaries and road and trail development that crosses streams would likely result in increases in turbidity through runoff as previously mentioned. While temporary and localized, these impacts would be considered unavoidable because of the recreation purposes of the National Area and the fact that the focus of many visits is river use in some form. Additional hazards having minor to major impacts on visitors and employees include contaminated mine drainage and oil and gas operations.

Some adverse impact would likely be unavoidable to resources, including sensitive resources, because of visitor use. Even with increased staffing and funding, the complexity of natural processes and the large number of cultural resources in the National Area would constrain the ability of the National Park Service to fully mitigate adverse impacts. Impacts would be expected to be minor in terms of overall loss, although there is a potential for this to be major if the loss involves nonrenewable historic or archeological resources.

Monitoring use and resource conditions would assist in avoiding or minimizing adverse impacts and, when coupled with appropriate management strategies, would generally promote sustainable conditions within the National Area. It is a legal requirement for NPS to address carrying capacity issues in general management planning. Based on this requirement, it is NPS policy to establish goals in general management plans for resource conditions and the visitor experience for all areas within the units it administers through the use of management zoning. More detailed quantification of use levels appropriate to those management goals and discussion of possible strategies that could be employed to manage use levels if necessary are then documented in later implementation planning.

The VERP planning process (Visitor Experience and Resource Protection) has been developed by the NPS to follow general management planning to complete the carrying capacity analysis. The VERP process can be conducted separately or incorporated into other implementation planning efforts. The process consists of four key elements: (1) an areawide management zoning scheme that defines visitor experience and resource condition goals for all locations (accomplished in the general management plan), (2) selection of indicators that can be monitored to ensure that the goals are being met, (3) a systematic monitoring program, and (4) standards for each monitored indicator that is expected to warn when conditions merit management action. Ongoing research will identify meaningful indicators and standards that can be used to ensure provision of quality experiences while protecting National Area resources.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

All facility development and use is considered essentially a permanent commitment of resources, although removal of facilities and site restoration has occurred and could still occur. New facilities would be developed on sites that have negligible resource value, which would be specifically considered during detailed implementation planning.

RELATIONSHIP BETWEEN SHORT TERM USES OF THE ENVIRONMENT AND MAINTENEACE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The resource prescriptions included in the management units, along with required management, are intended to ensure the achievement and maintenance of the purposes for which the National Area was established. All use and development would occur in the context of sustainable resource conditions that, in turn, permit sustained levels of visitor use and satisfaction.

Under this alternative, the vast majority of the National Area would remain protected in its natural state and would maintain its long-term productivity, i.e., ability to achieve its mission. A number of new actions would be taken to manage visitor use, including the designation of an official system of roads and trails and focused devotion of resources to rehabilitation of roads, trails, and developed sites. With increasing visitor use expected, there would be minor impacts on most natural resources in the National Area, with moderate impacts on soils and vegetation in some high use areas. Adverse impacts on the National Area's natural and

cultural resources would be mitigated to enhance the ability of these resources to contribute to the National Area's legislative mission.

MANAGEMENT ZONES

This alternative contemplates the most potential development of the four alternatives, with less of the plateau subject to use-limitations. The actual level of future development under this alternative would depend on future visitor use levels and funding capability. Alternative B divides the National Area into the same three management zones as Alternative A, namely, primitive recreation unit, enhanced recreation unit and backwoods recreation unit.

The application of these management zones to the National Area would provide area-specific management direction including an indication of the kinds and levels of allowable actions. The Primitive Recreation Unit has the lowest tolerance for degradation and specifies only necessary and minimal interference with natural processes. This prescription for the gorge would provide the highest level of protection for this area, which contains most of the sensitive natural resources. This protection, along with the lowest level of development, i.e., dispersed trails, would do the most to benefit natural systems.

The Enhanced Recreation Unit would be applied only to areas already partly developed. Any future development would necessarily require some land disturbance, but would be located and designed to avoid or minimize impacts. Generally, fairly sizable land areas were included within the Enhanced Recreation Units to allow avoidance of sensitive resources and natural systems. Later planning and appropriate coordination would assure detailed consideration of these concerns.

In contrast to the Enhanced Recreation Units, the designated Backwoods Recreation Units would see less development. Most of these units would not change appreciably from current conditions. The kinds and levels of development that would occur would follow the unit's management prescriptions.

NATURAL RESOURCES

Geology, Physiography, and Soils

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under Alternative B, visitor facilities would continue to consist primarily of a basic system of roads, trails, and access points. However, more facilities could be built under this alternative than under the Preferred Alternative or Alternative A.

Direct impacts from building activities would include surface compaction of soils. Site preparation could result in either removal or addition of earth, destroying soil structure. There would be an increase in sheet erosion and reduced water infiltration. These impacts would occur from the building activities and would be considered long term. Following development, use of the facilities would likely expand the area of soil compaction and root exposure generally around the facility and along nearby trails. These indirect impacts would also be considered long term, although unacceptable levels of impacts would be identified and corrected through visitor education, site hardening, and/or use management. Rehabilitation of impacted areas would occur where possible.
Impacts associated with development and rehabilitation of facilities would be negligible to moderate, long-term and adverse for soil resources.

In contrast to the No-action Alternative, Alternative B provides in general terms that the National Area will implement measures designed to protect and conserve the National Area's geologic, physiographic, and soil resources. These measures are described with less specificity in Alternative B than in the Preferred

Alternative. If fully funded and implemented, these measures would have a moderate to major, long-term, beneficial impact on soils and geologic resources.

NPS policy prohibits the surface mining of soil, gravel, or rock materials for any park operations purposes, including the building of roads or facilities. Most modifications to access roads, trails, and developed sites would be limited to existing disturbed areas and would not likely involve blasting or other modification of bedrock geology. The potential impacts to geologic resources from road or facility development or NPS operations would thus be negligible. In contrast, visitor activities have the potential to adversely impact sensitive geologic resources such as rock shelters, arches and chimneys. Under Alternative B, these features would be managed in accordance with the management prescriptions established for the alternative's three management zones. These resources would not be subject to the specialized zoning for sensitive resources found in the Preferred Alternative. The resulting adverse impacts would be greater than under the Preferred Alternative, but less than under the No-action Alternative. The overall impacts on these geologic features would be negligible to moderate, long-term and adverse.

Alternative B would likely result in more increases in visitation to the National Area than any of the other alternatives. Increases would occur as a result of improved facilities, new facilities, and increased opportunities for certain types of outdoor experiences. In particular, visitor activities such as camping, hiking, climbing, and horseback riding would likely increase over levels anticipated by the other alternatives and would continue to have localized effects on soils. Impacts on soils would be minimized via an upgraded program for maintaining and rehabilitating roads, trails, and developed sites. However, this alternative would not include the use-designations for particular roads and trails found in the Preferred Alternative. As a result, certain roads and trails would continue to be difficult to maintain and would continue to erode as they experienced inappropriate use.

Visitors would continue to overuse some facilities such as certain trails and also use inappropriately, and in some cases illegally, certain sensitive, readily accessible resources such as rock shelters and arches. In previously undisturbed areas, human trampling would result in vegetation loss followed by soil compaction and erosion. Social trails on sloping hillsides would act as channels for surface water runoff, resulting in soil erosion. These negative impacts would be mitigated under Alternative B by focusing additional resources on monitoring and rehabilitation of disturbed areas. The increased visitor use associated with this alternative would result in negligible to moderate, long-term and adverse impacts on soils and geologic resources throughout much of the National Area.

In some high-use areas, such as Bandy Creek, there would be minor to moderate adverse impacts, as repeated trampling resulted in high plant mortality and increased erosion potential. Under Alternative B, NPS staff would devote additional resources to problem sites to prevent and reduce impacts and to restore damaged areas. However, these efforts would not prevent or reduce all impacts under the increased visitation levels anticipated under this alternative. Thus, minor to moderate long-term adverse impacts would likely occur in high-use areas.

In other, more remote areas of the National Area, there would be negligible to minor adverse impacts on soils under Alternative B, as relatively few plants, in localized areas, would be affected by trampling and other disturbance. The potential for soil erosion in these areas would not increase appreciably, even with increased visitation.

Increased parking by visitors in vegetated areas would cause loss of vegetation, which would contribute to soil erosion. Because these effects would be localized and occur in previously disturbed areas, the impacts would be negligible to minor.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities under Alternative B would result in localized, minor, long-term, and adverse impacts on soils and geologic resources, with moderate impacts in some high use areas. Impacts would include increased soil compaction and erosion. However, these impacts would be minimized by the

management prescriptions contained in Alternative B's three management zones. The result would be minor to moderate, long-term and beneficial impacts on soils and geologic resources. In the region as a whole, there would likely be minor to major long-term cumulative adverse impacts on soils and geologic resources, primarily due to logging, mining, oil and gas extraction, and land development. This alternative's contribution to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any geologic, physiographic, or soil resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the geologic, physiographic, and soil resources of the National Area.

Water Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Alternative B provides in general terms that National Area personnel would continue or commence various initiatives to protect and improve water quality. These measures are described with less specificity in Alternative B than in the Preferred Alternative. Overall, these measures would have a moderate to major, long-term, beneficial impact on water quality. Nevertheless, minor to moderate, long-term adverse impacts on water quality would continue under Alternative B, given that land uses in the watershed outside the National Area boundary would continue to result in slight increases in levels of sediment, pollutants, and nutrients in the water.

As a result of the improved access and rehabilitated roads and trails contemplated by Alternative B, visitor activities such as camping, hiking, climbing, and horseback riding would likely increase more than they otherwise would under the No-action Alternative. These levels of visitor use would continue to have localized, indirect effects on water quality due to increased soil compaction, vegetation trampling, and consequent loss of vegetation in some areas. These effects would lead to greater erosion and the addition of sediment to adjacent waters. The nature and extent of soil compaction and vegetation damage, and therefore, of related impacts on water quality, would depend on the types of local soils, vegetation and topography, as well as the areal extent, duration, and intensity of use. However, sedimentation effects generally would be slight in comparison to the sedimentation occurring as a result of runoff from disturbed areas outside the National Area. Therefore, sedimentation-related impacts on water resources would be negligible to minor.

A number of development sites are adjacent to the Big South Fork River or other streams because they provide visitor access to and use of the waters within the National Area. Roads and trails that cross streams would also contribute to stream turbidity during development periods and during certain maintenance activities. Standard mitigating measures such as silt screens, check dams, retention ponds, and other barriers would be used to minimize erosion and prevent noticeable short-term deterioration of water quality during any ground disturbance. All disturbed areas would be revegetated to prevent long-term impacts from any runoff. Monitoring of water quality would be an important management activity. Development-related impacts on water quality are thus anticipated to be negligible to minor, short-term and adverse.

The increased use of unpaved roads under Alternative B could make these facilities more susceptible to surface erosion and runoff. Vehicle use along roads and in parking lots would continue to deposit petroleum products that could be washed into adjacent waters. Impacts would generally be minor due to mitigation techniques such as placement of sediment traps and and/or biofiltration (vegetation filtration) along roadsides. Improper disposal of untreated human waste in areas without toilet facilities currently causes minor water quality problems. Under Alternative B, this problem would increase proportionately with increased human use of the area.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Expected levels of visitor use under Alternative B would have a minor adverse impact on resources and water quality by increasing levels of sediments, vehicle-related pollutants, and nutrients in rivers and streams. Most of these effects would be localized. Oil and gas development within the boundary of the National Area would increase the amount of disturbed area, possibly contributing increased sediment and polluted runoff to adjacent receiving streams. Because Alternative B prescribes, in general terms, enhanced management control for these operations, the impact of these operations on water quality would be localized, minor, short-term, and adverse. Overall, impacts on water quality would be minimized by the rehabilitation activities, management zones, and management prescriptions contained in Alternative B, although not to the same extent as would likely occur under the more comprehensive and detailed management prescriptions of the Preferred Alternative. In some instances, water quality would be enhanced by the measures called for in Alternative B. The impacts of Alternative B on water quality would thus be minor, long-term, and beneficial as compared to the No-action Alternative. There would be major to moderate, long-term and adverse cumulative impacts in the region, primarily because of pollutant loads in runoff associated with logging and land development outside the National Area. The contribution of Alternative B to these adverse cumulative impacts would be minor.

Existing conditions are causing major adverse impacts to water quality in certain portions of the National Area. Alternative B would ameliorate some of these conditions, but to a lesser extent than the Preferred Alternative. As a result, this alternative would not result in major, adverse impacts to any water resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in additional impairment to the water resources of the National Area.

Floodplains

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Alternative B would have negligible adverse impacts on floodplain values for the Big South Fork and its tributaries. These impacts would be associated with the development, rehabilitation and enhanced maintenance of access roads, trails, parking areas, and stream crossings in the floodplain, all of which have negligible impacts on floodplain resources and functions and hence are exempt from NPS policies on floodplain management (Director’s Order 77-2; NPS Floodplain Procedures Manual 77-2).

Streamside facility development would occur to some extent within the 100-year floodplain; however, as noted above, NPS has determined that water access facilities are acceptable uses of floodplains. These types of facilities must be in proximity to the water to provide needed visitor access and use. Facility design would consider the likelihood of flooding and would include appropriate visitor warnings. More streamside development would occur under this alternative than under any of the others; however, the impacts to floodplain resources would be negligible.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would result in negligible long-term adverse impacts on floodplain values throughout the National Area. Cumulative impacts would include moderate adverse long-term effects on floodplains because of actions outside the National Area. This alternative’s contribution to these impacts would be negligible.

This alternative would not result in major, adverse impacts to any floodplain resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area;

(2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the floodplain resources of the National Area.

Wetlands

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Streamside facility development would occur to some extent within the 100-year floodplain. These types of facilities must be in proximity to the water to provide needed visitor access and use. When specific development is determined and sites selected, whether at a streamside location or elsewhere, a wetland impact determination would be made. If appropriate, detailed analysis of potential impacts on wetlands would be provided in the environmental documentation prepared for each development project.

Existing practices that prevent indirect impacts on wetland areas would continue. Overall, impacts to wetland resources are expected to be negligible.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would not cause any impacts on wetlands. Although there would be a moderate, long-term, adverse cumulative impact on wetlands in the region, the contribution of this alternative to this impact would be negligible.

This alternative would not result in major, adverse impacts to any wetland resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the wetland resources of the National Area.

Air Quality

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under Alternative B, visitor use is expected to increase at a somewhat greater rate than under the other three alternatives. As a result, the number of vehicle miles traveled in the National Area and surrounding areas should be greater under this alternative than under the other alternatives. The resulting increase in vehicular emissions, coupled with a slight increase in the number of campfires, would likely result in increased emissions of particulates, carbon monoxide, and volatile organic compounds. Therefore, Alternative B would have a negligible to minor, log-term and adverse impact on air quality.

During development, there would be a temporary increase in particulates (fugitive dust) and vehicle emissions where motorized equipment is used. Standard mitigation includes watering the disturbed areas. This would be a temporary condition and would not violate air quality standards.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. This alternative would result in a negligible to minor impact on local air quality, due to slight increases in pollutants from vehicle exhaust and campfires. Cumulative impacts would include minor, adverse

impacts on regional air quality, as well as minor, adverse impacts on regional visibility. This alternative's contribution to these regional impacts would be negligible to minor.

This alternative would not result in major, adverse impacts to any air resource or value, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the air resources and values of the National Area.

Vegetation

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Alternative B provides in general terms that National Area personnel would continue or commence various initiatives to protect and restore native vegetation. These measures are described with less specificity in Alternative B than in the Preferred Alternative. The impacts of these initiatives on vegetation in the National Area would be minor to moderate, long-term, and beneficial.

Visitor activities such as camping, hiking, climbing, and horseback riding would increase more under this alternative than the other alternatives. In most areas, the impacts from these activities on vegetation would continue to be localized and minor to moderate. In undisturbed areas, human trampling would bend or break aboveground plant parts. Trampled vegetation makes a site easily recognizable as an informal (social) trail or campsite, often causing human use to escalate. Repeated use of these newly disturbed areas, as well as previously disturbed areas, would result in vegetation loss. In some high-use areas, such as Twin Arches, there would be moderate adverse impacts, as repeated trampling resulted in high plant mortality. Under Alternative B, NPS staff would focus additional resources on problem sites in order to prevent and reduce impacts and restore vegetation. The impacts associated with these efforts would be minor to moderate, long-term and beneficial.

The nature and extent of vegetation loss under Alternative B would depend upon the amount, timing, type, and location of use. More facilities would be built under this alternative than the other alternatives, thereby creating more areas where vegetation could be adversely affected by concentrated visitor usage. In high-use areas, plant mortality would result in continued degradation even after recreational use ceased because many plant species are unable to generate new growth following trampling, and vegetation loss occurs quickly. In other areas of the National Area, there would be negligible to minor adverse impacts to vegetation as relatively few plants, in localized areas, would be affected.

A number of special plant habitats occur in the National Area, including rock shelters, cliff areas, and gravel/cobble bars along the river. These habitats harbor rare and unusual plant communities that are particularly susceptible to human impacts. Existing uses are impacting a number of these communities, especially at Station Camp and Big Island. Various plant species are being affected, including plants listed as threatened or endangered by state and federal authorities. In extremely sensitive plant communities, relatively minor impacts could adversely affect rare, threatened, or endangered plants. Given the important local and regional role played by the National Area in conserving rare, threatened, and endangered plants, active management will be required to protect and enhance species abundance and composition. Under this alternative, these impacts would be assessed and appropriate management strategies would be developed and implemented.

Increased visitor use might also help spread exotic (non-native) or noxious species from seeds carried into the National Area on vehicles, horses, clothing, maintenance equipment, and other materials. Impacts would

range from minor to moderate, depending on the type of plant and where it was introduced. Moderate impacts would occur if a local population of a species or plant community were sufficiently affected to cause a change in its abundance or distribution. The inventory and monitoring program prescribed under this alternative would allow NPS personnel to identify problem areas and develop response strategies.

The use of OHVs in the National Area would continue under Alternative B, but usage would be limited to specific trails and designated areas appropriate for their use. By directing OHVs toward appropriate areas and away from sensitive environments, damage to vegetation would be greatly reduced, resulting in impacts that are minor to moderate, long-term and beneficial to the National Area as a whole. Impacts to the areas where OHV use is allowed would be minor to moderate, long-term, and adverse. To the extent that OHV users were to leave the designated trails and create new routes or social trails, impacts to vegetation would be minor to major, long-term and adverse.

Dust and pollutants from motor vehicles in the area would increase slightly and continue to affect vegetation adjacent to roadways by interfering with plant respiration and causing plant decline in leaves. Increased parking by visitors in vegetated areas would cause loss of vegetation, which might lead to invasion by noxious weed species. Because these effects would be localized, the impacts would be negligible to minor.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities associated with Alternative B mostly would result in localized, minor, long-term and adverse impacts on vegetation, with moderate to major impacts in some high use areas such as Bandy Creek, Twin Arches, and Blue Heron. Impacts would include trampled vegetation, loss of plants, and the spread of exotic species. These impacts would be minimized and in some cases offset by the rehabilitation activities, ecosystem restoration, and use of management zones and prescriptions called for under this alternative. The impacts associated with these efforts would be minor to moderate, long-term and beneficial. In the regional context, there would continue to be minor to major long-term cumulative adverse impacts on vegetation, primarily due to mining, logging, fire management, oil and gas extraction, and land development. The contribution of Alternative B to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any vegetation resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the vegetation resources of the National Area.

Terrestrial and Aquatic Animal Life

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Alternative B provides in general terms that National Area personnel would continue or commence various initiatives to protect and restore native vegetation. These measures are described with less specificity in Alternative B than in the Preferred Alternative. The impacts of these initiatives on terrestrial and aquatic animal life in the National Area would be minor to minor to moderate, long-term, and beneficial.

Visitor uses such as camping, hiking, and horseback riding would likely increase at a somewhat greater rate under Alternative B than under the other alternatives. Impacts from these activities could include increased noise, vehicular traffic and habitat disturbance. The impacts of these activities under Alternative B would be adverse and would range from negligible to moderate.

Most visitor use is concentrated in the center of the National Area. Increased human presence in these areas would result in some additional disturbance to wildlife. However, because these areas are already heavily

used, it is doubtful that slight increases in human activity would noticeably increase impact to wildlife and wildlife habitat in these areas. Wildlife sensitive to human use already avoid these areas, and animals that do inhabit such locations would be accustomed to human use and would not be further impacted by additional human usage. To the extent that wildlife was disturbed, it would be temporary and would not affect local or regional populations. Therefore, the impacts in these areas, though adverse, would be negligible. Minor to moderate impacts would occur at new development sites, where wildlife would experience new or increased disturbance from human visitation.

Increased use would result in a proportional increase in improper food storage by visitors. Food and garbage left out attracts wildlife, resulting in animals associating food with people and possibly causing human-wildlife conflicts. Some visitors would continue to feed wildlife, which would also condition wildlife to associate humans with food. Existing wildlife management practices, such as providing wildlife-resistant garbage cans and educating visitors, would continue to be implemented, resulting in negligible to minor beneficial impacts.

Increased visitation levels may result in more hunting pressure in the National Area. All hunting activities are governed by regulations issued by the states of Tennessee and Kentucky. Because the take-limits set by these regulations are based, in part, on anticipated hunting pressure, only negligible to minor impacts on local and regional populations would occur.

Wildlife are occasionally injured or killed by motor vehicles on park roads, and this impact might increase under Alternative B as a result of additional motor vehicles traveling to new and existing facilities. These adverse impacts would be minor because they would affect individuals, not entire populations.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Increased visitor activities associated with Alternative B would cause negligible to minor long-term adverse impacts on wildlife. Impacts would be associated with increased visitor use displacing or disturbing wildlife, conditioning wildlife to associate humans with food, and injuring or killing wildlife in collisions with motor vehicles. Impacts would be greater under this alternative than any of the others due to the increased levels of development contemplated by this alternative. Other aspects of this alternative, including additional research and resource management initiatives, would result in minor to moderate, long-term and beneficial impacts to terrestrial and aquatic animal life. Cumulative effects would include minor to major long-term adverse impacts, primarily due to habitat loss associated with logging and land development outside the boundary. The contribution of this alternative to these cumulative impacts would be minor.

This alternative would not result in major, adverse impacts to any terrestrial or aquatic wildlife resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the terrestrial or aquatic wildlife resources of the National Area.

Special Status Species

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Under Alternative B, National Area staff would continue to develop protection strategies for stabilizing and enhancing threatened populations. Of special concern are unique vegetation communities (e.g., certain communities found at rock shelters and gravel bars), as well as plant species listed as threatened or endangered by state and federal authorities. Also of particular concern are special status aquatic species, including the duskytail darter, other special status fish species, and five species of mussels on the federal endangered species list. Those elements of this alternative addressed to improving water quality would have beneficial impacts on these species as well.

Until protective measures have been selected and implemented, the increased visitation anticipated under this alternative would likely result in continued adverse impacts to special status species, particularly mussels and some plants. Increased use of horse crossings at Station Camp and Big Island would likely result in continued mortality of individual special status mussels and unique plants in these areas, thereby having an impact on federally listed species.

To address this problem, NPS staff would supplement inventory studies with studies specifically designed to identify the best ways to minimize or eliminate the adverse impacts of facility development/maintenance and visitor use on special status species. In particular, studies would be commissioned to identify the best method(s) for trail/stream crossings that protect threatened and endangered species. In some areas trails would need to be relocated. Monitoring would also occur to insure that the protective measures selected by the National Area are, in fact, enhancing the long-term viability of special status species.

In addition, site-specific surveys would be conducted before implementing specific actions to determine if special status species existed in the project area. If any were located, the National Park Service would consult with the U.S. Fish and Wildlife Service and the states of Tennessee and Kentucky to determine mitigation measures to avoid or minimize adverse impacts on these species.

As a result of these initiatives, the actions contemplated in this alternative would not adversely affect special status species in the National Area.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Continued human use, along with expected increases in visitor use of the National Area, would cause disturbance to individuals of special-status species, as well as continuing mortality to individuals of special status mussels. In the short-term, impacts to mussels caused by horse crossings would continue to be minimized through the use of route-flagging. In the long-term, practical protective measures would be studied, implemented, and monitored in order to avoid adverse impacts to mussels and other special status species.

For activities in other locations, the survey, avoidance, and mitigation actions taken by the National Park Service would ensure that this alternative would minimize impacts on any federally or state listed species. The management zones prescribed in Alternative B would provide greater awareness of special status species than would the No-action Alternative, but less than the Preferred Alternative.

The effects of actions by others outside the National Area, when combined with the impacts of actions under Alternative B, would be likely to adversely affect special status species. With its provisions for additional research and corrective actions, Alternative B would not contribute to this cumulative effect.

This alternative would not adversely affect any special status species found within the National Area. Therefore, the environmental impacts associated with this alternative would not result in impairment to special status species.

CULTURAL RESOURCES

Archeological Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two (“Required Management”) of this document.

Analysis. Under Alternative B, archeological resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. Illegal relic hunting would continue, but efforts would be made to curtail this activity as staffing permitted. This alternative would likely result in more increases in

visitation than the other alternatives due to the development of additional facilities. These levels of visitation could result in slightly reduced levels of illegal relic hunting.

Direct impacts from development would be partially offset by cultural resource studies of areas to be developed. Ground disturbance would have the potential to adversely impact archeological resources, although many development sites in the National Area have been previously disturbed. Prior testing to permit consideration of alternate development sites would be undertaken. If avoidance of impacts on important resources were not possible, mitigation measures would be developed in consultation with the State Historic Preservation Officer and the Advisory Council on Historic Preservation. Mitigation could include, but not be limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations. If any unforeseen cultural resources were discovered, they would be documented and maintained according to NPS guidelines and standards. All actions that affect cultural resources would be in accordance with the *Secretary of the Interior's Standards for Archeology and Historic Preservation.*

In the near term, the National Area would expand its cultural resource management program and new initiatives would be undertaken to better define and manage cultural landscapes containing archeological resources. This approach would entail a more systematic survey of archeological resources than is contemplated under the No-action Alternative. Inventorying and classifying these sites and their features and determining their treatment would be an ongoing effort. As a result of these efforts, more archeological sites and isolated finds would be documented and protected. In addition, NPS staff would endeavor to enhance the management of National Area museum collections. Upgrading the Area's substandard collections-storage facility would increase the public's access to significant artifacts and would safeguard important resources in a manner consistent with accepted protection standards. Taken together, these actions would result in minor to moderate, long-term and beneficial impacts on known and newly-discovered archeological resources.

Disturbance can also result from unrestricted visitor access to areas of known sensitivity for archeological resources. Visitor access impacts can include disturbances caused by overflow parking along roadside and trailhead areas, the creation and use of social trails, and occasionally the use and maintenance of existing trails. Some known and suspected prehistoric archeological sites are located near areas of high public use and visibility, such as rock shelters and arches. Some of these have sustained impacts from both natural and human caused erosion, a consequence of pedestrian and equestrian traffic on both designated and social trails. Under this alternative, all areas having known archeological resources would be protected in accordance with NPS policies, and any new facilities would be sited and built in such a way as to avoid or minimize impacts on archeological resources. Protection of archeological resources would be somewhat less systematic under this alternative than under the Preferred Alternative because this alternative does not establish a Sensitive Resource Protection Zone with corresponding management prescriptions.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Under this alternative, a more systematic approach would be taken to the discovery, treatment, and protection of archeological resources than under the No-action Alternative. These efforts would complement established resource protection measures currently employed by National Area staff. The impacts to archeological resources from these measures would be minor to moderate, long-term and beneficial. More visitation, which could result in continuing erosion of some archeological sites, would have minor to moderate, long-term and adverse impacts to archeological resources that have not yet been identified or have not yet been the subject of treatment and protection measures. When actions external to the National Area are considered in conjunction with this alternative and other actions inside the National Area, there would be a major adverse cumulative effect on archeological resources. This alternative would make a minor contribution to this adverse effect.

This alternative would not result in major, adverse impacts to any archeological resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the

environmental impacts associated with this alternative would not result in impairment to the archeological resources of the National Area.

Ethnographic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. After the National Area was established, acquisition of land by the federal government resulted in the relocation of families and individuals away from their traditional homesites. Relatives of many of these people still live in the surrounding area. However, the National Area's enabling legislation resulted in the closure of most roads into the gorge. As a result, many local residents are prevented from having traditional motorized access to various sites of interest. Lack of use has resulted in the natural succession of many sites to forest.

The gorge will remain closed to most motorized access under all of the alternatives, in accordance with the dictates of the enabling legislation. Continued closure will result in moderate to major, long-term and adverse impacts to persons deprived of motorized access to traditional use sites. However, these impacts are not attributable to the alternatives per se, but stem from legislative requirements.

Under Alternative B, certain sites will continue to be preserved and interpreted for visitors, including the Oscar Blevins, Lora Blevins and John Litton farmsteads. Other traditional use sites are designated for continuing use, such as the Burnt Mill Bridge. In addition, oral histories will continue to be accumulated to document past residents' observations and experiences.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Establishment of the National Area required closure of most of the gorge to motorized access, resulting in moderate to major, long-term and adverse impacts to ethnographic resources. However, various sites and ethnographic resources within the National Area are being actively used or protected and interpreted for visitors, and these activities would continue under Alternative B. The impacts of these activities on ethnographic resources would be minor to moderate, long-term and beneficial.

Historic Resources

Applicable Laws and Policies. The laws, regulations, and policies that govern NPS actions with respect to this impact topic are presented in Chapter Two ("Required Management") of this document.

Analysis. Under Alternative B, historical resources would continue to be adversely impacted, but to a lesser extent than under the No-action Alternative. This alternative would likely result in a greater increase in visitation than would occur under the other alternatives due to the development of additional facilities. These levels of visitation could result in more adverse impacts to historical resources than would occur under the Preferred Alternative or Alternative A.

Under this alternative, there would be a continued deterioration and loss of the historic fabric as a result of natural deterioration and ongoing human interaction. This alternative calls for an ongoing effort to inventory and classify historic sites and their features and determine their treatment. Decisions would then be made based on specified criteria to preserve, rehabilitate, or restore particular historic resources. For the rest, the toll of natural processes would be accepted after appropriate documentation. As a result of these efforts, more historical sites would be documented and protected than would be possible under the No-action Alternative.

Throughout the National Area, mitigation measures would be employed to minimize the loss of historic resources. In situations where potential impacts are identified, possible mitigation could include, but not be

limited to, avoidance and protection, data recovery (evaluated as an adverse impact that would be undertaken as a last resort), and educational outreach programs such as informative onsite tours and presentations.

Under this alternative, appropriate management prescriptions would be implemented for protecting historic resources from disturbance or destruction. Increased visitation could result in physical wear and tear on structures, vandalism, and possible overuse of grounds. Efforts to minimize these effects would include careful determination of resources suitable for onsite interpretation to visitors, careful site selection for developments, visitor education, structured use of the site/resource by specific pathways, or the use of guides. Adaptive uses, such as at Charit Creek lodge, would help preserve structures and other features. While historic fabric could be affected, prior Historic Structure Reports would document important elements. Monitoring of the resource conditions would be an important management function. Treatment measures for historic resources would continue to conform to the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties*, 36 CFR section 68. However, as structures aged and more visitors to the National Area encountered historic structures, the potential would exist for increasing impacts.

As a result of the actions described above, this alternative would result in minor to moderate, long-term and beneficial impacts to historic resources.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Adverse effects to historic resources would continue under this alternative, but to a lesser extent than under the No-action Alternative. Efforts would be undertaken to inventory, classify, and monitor historic resources. Decisions would be made based on specified criteria to preserve, rehabilitate, or restore certain historic resources. The remaining historic resources would continue to be impacted by natural processes, but these impacts would be mitigated in ways appropriate to the site. The result would be minor to moderate, long-term and beneficial impacts on historic resources. More visitation, which could result in continuing deterioration of some historical sites, would have minor to moderate, long-term and adverse impacts to historical resources that have not yet been the subject of treatment and protection measures. Regionwide development activities would continue to have a cumulative adverse effect on historic resources. This alternative would make a minor contribution to the regionwide cumulative adverse effect.

This alternative would not result in major, adverse impacts to any historic resource, the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, the environmental impacts associated with this alternative would not result in impairment to the historic resources of the National Area.

VISITOR USE AND EXPERIENCE

Analysis. Under this alternative, a variety of natural and cultural features would remain readily available for visitor use, including the river, gorge rim views, and certain historic sites. Many other features would likewise be available depending on visitor interests and abilities. However, compared to the No-action Alternative, access to some of these features would greatly improve under this alternative. Of all the alternatives, Alternative B would place the greatest emphasis on visitor use. The enhanced recreation zone is larger under this alternative than under Alternative A. In addition, more facilities would be built under Alternative B than any of the other alternatives.

As provided by the legislation establishing the National Area, access to game for hunting, trapping, and fishing would continue under joint federal and state management. However, motor vehicle access to many sites in the gorge would remain largely curtailed due to legislative restrictions. To address this problem, access for hunters would continue to be available along designated access routes.

Public education programs and exhibits would continue to be provided on- and off-site on a variety of resource-related subjects. This alternative would benefit public understanding over the long term as opportunities are continuously taken by National Area personnel to communicate elements of the alternative as well as required management. Overall visitor satisfaction would tend to increase since it would be clearer to them what to expect before arrival.

Visitors would continue to have access to concessioner services, especially at the Charit Creek Lodge and the Station Camp and Bandy Creek horse camps.

Uncrowded areas and solitude would remain widely available, but would diminish slightly over time as visitation levels increased. However, the establishment of a designated system of roads and trails would allow focused application of maintenance and rehabilitation efforts, thereby improving the quality of the visitor experience. The impacts from these efforts would be minor to moderate, long-term and beneficial for most visitors.

Overall, the impact of this alternative on visitor use and experience would be minor to moderate, long-term and beneficial.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. Under this alternative, the general character of the National Area would not change, but the designation of an official roads and trails system, and the focused devotion of resources to rehabilitation and maintenance of those facilities, would result in minor to moderate beneficial impacts on visitor use and experience. Should conditions warrant, this alternative provides for the development of more visitor facilities than would be possible under the other alternatives. Nevertheless, visitors would continue to have opportunities for solitary experiences, and for more social forms of recreation and experience as well. In contrast to the No-action Alternative, expanded educational and outreach programs would be undertaken, resulting in increased knowledge and enjoyment of resources in the National Area. Impacts from this alternative would be long-term, minor to moderate, and beneficial, depending on location in the National Area and visitor preferences.

SOCIOECONOMIC ENVIRONMENT

Operation of the National Area

Analysis. Under Alternative B, the National Park Service would undertake significant efforts to provide new trailheads and trail connectors, improve the condition of existing roads, trails and developed sites, and increase monitoring of natural and cultural resources. The actions contemplated by this alternative would require new expenditures for additional labor and supplies from local communities. More development is called for under this alternative than the other alternatives, and the expenditures for labor and supplies would be correspondingly greater, resulting in larger beneficial impacts to the local and regional economy. In addition, nearby communities would continue to experience direct benefits of expenditures by NPS for supplies and by individual NPS employee purchases. National Area employee salaries currently total approximately $2.9 million, which directly benefits the local economy. The increased National Area staff associated with this alternative would increase the total salary amount being spent in the local economy. The impacts of all additional development and maintenance activities on the local and regional economy would be moderate to major, long-term and beneficial.

Cumulative Impacts. Same as the Preferred Alternative

Conclusion. Any socioeconomic impacts on the region that could be expected under this alternative would be moderate in effect. Although there would probably be major adverse and beneficial cumulative impacts on the economy from regional growth, the impact of National Area operations on the regional economy would be moderate under this alternative. Impacts to the local economy would be somewhat more pronounced, with this alternative having a moderate to major, beneficial impact on the local economy.

Tourism and Recreation.

Analysis. The identification of long-term goals in this alternative will allow surrounding communities to better understand where the National Area is headed, allowing all parties to begin to work more in concert. Visitor patterns may change from current ones under this or any other alternative, but they would become more predictable since they would be based on a more clearly identified management direction. Businesses oriented to National Area visitors would be better able to align their expectations with National Area goals; and with limits placed on the kinds and levels of development within the National Area, the neighboring communities would better understand the role they could play in providing services. With realized expectations of businesses could come additional business ventures.

Under this alternative, the National Area would be in a position to gain increasing visibility and become known to a wider range of potential visitors. Currently, visitors coming to the National Area are arriving with expectations of certain conditions, facilities, and experiences. In contrast to the No-action Alternative, and to a greater extent than Alternative A (but less than the Preferred Alternative), this alternative would better enable National Area personnel to meet these expectations by providing greater numbers and types of recreational opportunities, better maintained facilities, and enhanced protection for natural and cultural resources. As the quality of the visitor experience is maintained or improved, visitation may also increase, along with associated benefits to the economy.

Under this alternative, gateway communities would continue to experience positive cyclical increases in business related to tourism. The local tourism industry would depend in part on, and benefit from, visitors attracted to the National Area, and the National Area would continue to be an important attraction in the area. The overall impact of the National Area on gateway communities or the regional area could change appreciably under this alternative, with the increases in visitation anticipated under Alternative B likely resulting in proportionately greater visitor expenditures in gateway communities than would take place under the other alternatives. As a result, this alternative would likely have a moderate to major, long-term, indirect and beneficial impact on the growth of the local tourism economy.

Cumulative Impacts. Same as the Preferred Alternative.

Conclusion. By enhancing the attractiveness of the National Area to potential visitors, this alternative would likely have a moderate to major, long-term, indirect and beneficial impact on the growth of the local tourism economy. This alternative would provide a moderate increase in regional recreation opportunities, with a moderate, beneficial impact on the regional tourism economy.

Concessions

Analysis. Alternative B contemplates more potential visitor-use development than any of the other alternatives. As a result of these developments and associated increases in visitation, concession contractors and other business permit holders could experience greater increases in business activity under this alternative than the other alternatives. The impacts of Alternative B on concessioners would be minor to moderate, long-term and beneficial.

Cumulative Impacts. Alternative B could result in minor to moderate beneficial impacts to concessioners. These impacts, in conjunction with the normal tourism-related growth in the vicinity of the National Area, would have a minor to moderate beneficial cumulative impact. The contribution of Alternative B to this beneficial impact would be minor to moderate.

Conclusion. The socioeconomic impacts on concessioners and other commercial businesses operating within and adjacent to the National Area would be minor to moderate, long-term and beneficial under Alternative B. In light of the positive effect on overall recreational activity of other developments in the vicinity of the National Area, the cumulative effects would be minor to moderate and beneficial.

OPERATIONAL EFFICIENCY

Analysis. Under Alternative B, the National Area would generally continue to use existing infrastructure, although more development of new recreational facilities, such as trails, paved roads, overlooks, and parking areas, would occur under this alternative than under the other three alternatives. In addition, development of a new collections-storage facility is proposed in order to provide public access to significant artifacts and allow protection of these resources in a manner consistent with accepted standards. Much of the National Area's existing office space is presently located in aging houses acquired with the Area's land base, and these structures would be replaced as they reach the end of their useful lives.

Continued use of existing administrative facilities would continue to have a negligible to minor adverse impact on operational efficiency. Occasional replacement of outdated facilities under this alternative would yield minor, long-term and beneficial impacts to operations. In contrast to the No-action Alternative, this alternative calls for slightly increased levels of NPS staff. Although current staff levels have achieved a certain level of efficiency, the additional staff in this alternative would enhance the National Area's ability to provide adequate levels of resource protection and preservation, maintenance of existing facilities, and visitor services. Under this alternative, maintenance needs would decrease as improperly designed and difficult-to-maintain roads and trails would be excluded from the National Area's official roads and trails system. Visitor use would be limited to those roads and trails included in the official roads and trails system. Substantial rehabilitation would take place for officially-recognized roads and trails, thereby making protection of resources easier for National Area staff. Taken together, these impacts would have a minor to moderate, long-term and beneficial impact on operational efficiency.

Cumulative Impacts. Same as under the Preferred Alternative

Conclusion. Alternative B would result in minor, beneficial changes in operations of the National Area. Although impacts to operational efficiency resulting from retention of most of the existing administrative buildings, work space, and visitor contact facilities would be negligible, the proposed increases in staffing levels would enhance operational efficiency, allowing National Area staff to provide improved protection for visitors and area resources. Thus, this alternative would result in impacts that are minor to moderate, long-term and beneficial.

Operational efficiency under this alternative would not result in major, adverse impacts to a resource or value the conservation of which is (1) necessary to fulfill specific purposes identified in the establishing legislation of the National Area; (2) key to the natural or cultural integrity of the National Area or to opportunities for its use and enjoyment; or (3) identified as a goal in this plan or other relevant National Park Service planning document. Therefore, operational efficiency achieved under Alternative B would not result in impairment to National Area resources or values.

CONSISTENCY WITH THE PLANS OF OTHERS

Under Alternative B, National Area management would provide more recreational opportunities than are available under the other alternatives. As with the Preferred Alternative and Alternative A, the clearer management direction provided by Alternative B would provide greater consistency with the plans of others. As a result, there would be no adverse impacts on the plans of surrounding communities or other Area neighbors. Community goals in the surrounding counties generally include providing for beneficial interrelationships between work, living, and recreational areas, protecting natural resources for the use and enjoyment of present and future citizens and visitors, developing the area without spoiling the environment, and providing citizens with a high-quality environment for living, work, and leisure time activities. The overall preservation and use of the National Area generally contribute to these goals, and this would continue under Alternative B. Cooperation with adjacent publicly owned areas will continue to contribute to satisfactory relationships. Under Alternative B, greater emphasis will be placed on cooperation with the town of Rugby.

State recreation planning indicates the National Area contributes importantly to the supply of public recreation opportunities and to other, related goals. Significant among these are resource preservation and interpretation, provision of appropriate facilities, and the long-term benefit to the economy. Alternative B, with its management unit applications, would appear to provide the desired consistency with state recreation planning. Aside from the basic mandated purposes of the area, the gorge would receive the highest level of protection and the plateau would have potential for additional development. This arrangement would appear to be consistent with state and local goals as well.

National Area management would continue to coordinate with businesses that provide visitor services and to cooperate to achieve the objectives of all parties. Nevertheless, various private land use and business ventures would continue to appear near and adjacent to the National Area whose objectives do not fully consider the Area's management requirements.

IMPACTS ON ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Private vehicles would continue to be the primary means of transportation to and through the National Area. There may be a gradual reduction in visitor, commuter employee, and concessioner gasoline consumption because of vehicles achieving better fuel economy as newer models replace older models over time.

UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse impacts are defined as impacts that cannot be fully mitigated or avoided. Adverse impacts attributable to this plan and NPS management would arise out of facility development, maintenance, and use. Important adverse impacts should not have to occur since the management units include sufficient area for sensitive facility siting. Standard practice also includes mitigation of all identified impacts. Law, policy, and standard procedures guide these detailed considerations.

Development at or near the river and its tributaries and road and trail development that crosses streams would likely result in increases in turbidity through runoff as previously mentioned. While temporary and localized, these impacts would be considered unavoidable because of the recreation purposes of the National Area and the fact that the focus of many visits is river use in some form. Additional hazards having minor to major impacts on visitors and employees include contaminated mine drainage and oil and gas operations.

Some adverse impact would likely be unavoidable to resources, including sensitive resources, because of visitor use. Even with increased staffing and funding, the complexity of natural processes and the large number of cultural resources in the National Area would constrain the ability of the National Park Service to fully mitigate adverse impacts. Impacts would be expected to be minor in terms of overall loss, although there is a potential for this to be major if the loss involves nonrenewable historic or archeological resources.

Monitoring use and resource conditions would assist in avoiding or minimizing adverse impacts and, when coupled with appropriate management strategies, would generally promote sustainable conditions within the National Area. It is a legal requirement for NPS to address carrying capacity issues in general management planning. Based on this requirement, it is NPS policy to establish goals in general management plans for resource conditions and the visitor experience for all areas within the units it administers through the use of management zoning. More detailed quantification of use levels appropriate to those management goals and discussion of possible strategies that could be employed to manage use levels if necessary are then documented in later implementation planning.

The VERP planning process (Visitor Experience and Resource Protection) has been developed by the NPS to follow general management planning to complete the carrying capacity analysis. The VERP process can be conducted separately or incorporated into other implementation planning efforts. The process consists of four key elements: (1) an areawide management zoning scheme that defines visitor experience and resource condition goals for all locations (accomplished in the general management plan), (2) selection of indicators that

can be monitored to ensure that the goals are being met, (3) a systematic monitoring program, and (4) standards for each monitored indicator that is expected to warn when conditions merit management action. Ongoing research will identify meaningful indicators and standards that can be used to ensure provision of quality experiences while protecting National Area resources.

IRRETRIEVABLE OR IRREVERSIBLE COMMITMENTS OF RESOURCES

All facility development and use is considered essentially a permanent commitment of resources, although removal of facilities and site restoration has occurred and could still occur. New facilities would be developed on sites that have negligible resource value, which would be specifically considered during detailed implementation planning.

RELATIONSHIP BETWEEN SHORT TERM USES OF THE ENVIRONMENT AND MAINTENEACE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The resource prescriptions included in the management units, along with required management, are intended to ensure the achievement and maintenance of the purposes for which the National Area was established. All use and development would occur in the context of sustainable resource conditions that, in turn, permit sustained levels of visitor use and satisfaction.

Under this alternative, the vast majority of the National Area would remain protected in its natural state and would maintain its long-term productivity, i.e., ability to achieve its mission. A number of new actions would be taken to manage visitor use, including the designation of an official system of roads and trails and focused devotion of resources to rehabilitation of roads, trails, and developed sites. With increasing visitor use expected, there would be minor impacts on most natural resources in the National Area, with moderate impacts on soils and vegetation in some high use areas. Adverse impacts on the National Area's natural and cultural resources would be mitigated to enhance the ability of these resources to contribute to the National Area's legislative mission.